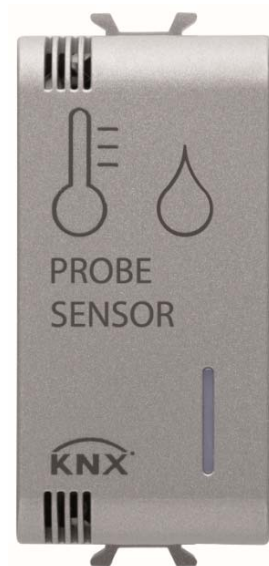


KNX/Easy temperature/humidity probe sensor - flush mounting



GW 1x762H

Technical manual

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1 Introduction

This manual explains the functions of the “**KNX/Easy temperature and humidity probe sensor**” (GW1x762H), and how they are set and configured with the aid of the ETS configuration software.

2 Application

With the aid of a KNX timed thermostat (GW 1x764 - GW 1x764H - GW1x794H) or a KNX thermostat (GW 1x765 - GW 1x765H - GW1x795H), the flush-mounting KNX/Easy temperature and humidity probe sensor allows you to manage the temperature of the room where it is installed.

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

The probe sensor is also able to detect the degree of humidity, and as a result turn a dehumidifier/humidifier on or off. The humidity values measured are transmitted on the BUS and are displayed on the supervisor or the KNX timed thermostats (GW 10 764H - GW 12 764H - GW 14 764H - GW 10 794H - GW 12 794H - GW 14 794H) or the KNX thermostats (GW 10 765H - GW 12 765H - GW 14 765H - GW 10 795H - GW 12 795H - GW 14 795H).

The main functions are:

- **Temperature measurement and threshold management (setpoints)**
 - current temperature, maximum and minimum, and dew point temperature (measurement unit in °C, °K, °F) and sending on BUS at variation, upon request, and/or periodically
 - setting of up to 4 temperature thresholds in heating or cooling mode, with hysteresis, and sending on BUS of different types of communication object (1 bit, 2 bit, 1 byte unsigned, 1 byte percentage, 1 byte HVAC, 2 byte unsigned, 2 byte signed, 2 byte setpoint in °C, 2 byte setpoint in °K, 2 byte setpoint in °F) when the set thresholds are exceeded
 - enabling of thresholds via the BUS

- **Humidity measurement and threshold management (setpoints)**
 - internal sensor for measuring the specific humidity in kg/kg
 - calculation of the maximum and minimum relative humidity expressed as percentage values
 - setting of up to 4 humidity thresholds in humidification or dehumidification mode, with hysteresis, and sending on BUS of different types of communication object (1 bit, 2 bit, 1 byte unsigned, 1 byte percentage, 1 byte HVAC, 2 byte unsigned, 2 byte signed, 2 byte setpoint in °C, 2 byte setpoint in °K, 2 byte setpoint in °F) when the set thresholds are exceeded
 - enabling of thresholds via the BUS

- **Thermal comfort**
 - setting of minimum and maximum temperature values, minimum and maximum relative humidity, specific humidity for defining the “thermal comfort” ranges for summer and winter
 - sending on the BUS of a “thermal comfort” signalling object when the values measured by the sensor are within the set temperature and humidity ranges

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 **Feedback sending trigger object**, as shown in Fig. 3.1.

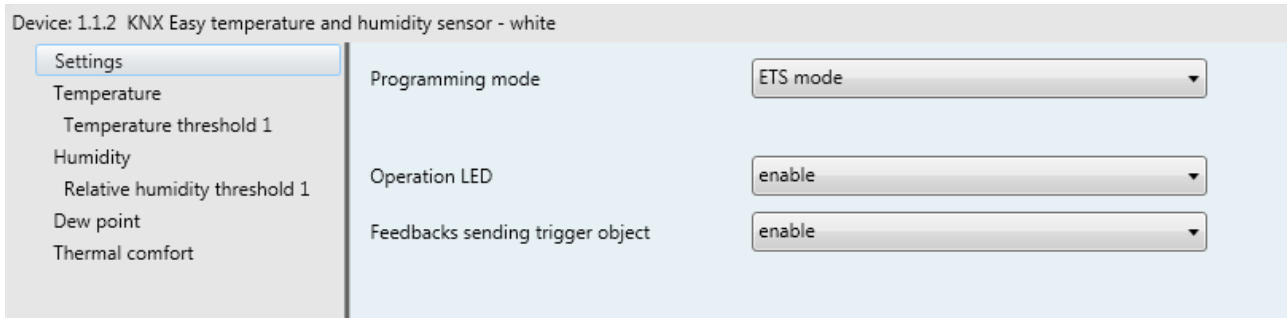


Fig. 3.1: “Settings” menu

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, which signals that the device is powered via the BUS. The values that can be set are:

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

➤ 3.1.3 Feedback sending trigger object

The “**Feedback sending trigger object**” parameter is used to enable the **Feedback sending trigger** input object (Data Point Type: 1.017 DPT_Trigger). When a BUS telegram is received on this object, with a logic value of “0” or “1”, the device automatically sends all the temperature indications (measured, maximum, minimum and dew point) and humidity indications (relative measured, relative maximum, relative minimum, and specific). The values that can be set are:

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

4 “Temperature” menu

The **Temperature** menu contains the parameters for configuring the functioning of the temperature sensor inside the device.

The structure of the menu is as follows:

Device: 1.1.2 KNX Easy temperature and humidity sensor - white

Parameter	Value / Setting
Internal sensor correction factor (tenths of °C)	0
Measured temperature	send in case of change
- Measure unit	Celsius degrees (°C)
- Minimum variation for sending value [± 0.1 °C]	5
Maximum and minimum temperature	sends on variation and periodically
- Measure unit	Celsius degrees (°C)
- Temperature minimum variation for sending value [± 0.1 °C]	5
- Temperature sending period [minutes]	5
Temperature threshold 1	enable
Temperature threshold 2	disable
Temperature threshold 3	disable
Temperature threshold 4	disable

Fig. 4.1: “Temperature” menu

4.1 Parameters

4.1.1 Internal sensor correction factor (tenths of °C)

This parameter is used to set the correction factor to be applied to the temperature value measured by the sensor on the device, in order to eliminate any possible heat contribution generated by the device or by the installation site. The values that can be set are:

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

4.1.2 Measured temperature

This is used to define the conditions for sending the temperature value measured by the device. The values that can be set are:

- **send on demand only**
- **send on variation - (default value)**

- *send periodically*
- *send in case of change and periodically*

Selecting the value **send in case of change** or **send in case of change and periodically**, the “**Minimum temperature variation for sending value [± 0.1°C]**” parameter will also be visible, whereas by selecting **send periodically** or **send in case of change and periodically** the “**Temperature sending period [minutes]**” parameter will be visible.

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.

4.1.3 Minimum variation for sending value [± 0.1°C]

If you want to send the temperature value following a minimum variation, you can specify the value of that variation in this field (in degrees, e.g. Celsius, ± 0.1°C). The values that can be set are:

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

4.1.4 Temperature sending period [minutes]

If you want to send the temperature value periodically, you can specify how often it should be sent in this field. The values that can be set are:

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

4.1.5 Measure unit

This is used to set the measurement unit with which the information will be coded and sent via the **Measured temperature** communication object. The values that can be set are:

- *degrees Celsius (°C) (default value)*
- *degrees Kelvin (°K)*
- *degrees Fahrenheit (°F)*

Depending on the value set for this parameter, the coding of the **Measured temperature** communication object: (9.001 DPT_Value_Temp) if the value is **degrees Celsius (°C)**, 9.002 DPT_Value_Tempd if the value is **degrees Kelvin (°K)**, and 9.027 DPT_Value_Temp_F if the value is **degrees Fahrenheit (°F)**.

4.1.6 Maximum and minimum temperature

The “**Maximum and minimum temperature**” parameter is used to define the conditions for sending the value of the maximum and minimum temperature measured by the device. The values that can be set are:

- *send on demand only*
- *send on variation - (default value)*
- *send periodically*
- *send in case of change and periodically*

Selecting the value **send on variation** or **send in case of change and periodically**, the “**Minimum temperature variation for sending value [± 0.1°C]**” parameter will also be visible, whereas by selecting **send periodically** or **send in case of change and periodically** the “**Temperature sending period [minutes]**” parameter will be visible.

Selecting the value **send on demand only**, no new parameter will be enabled, as the maximum and minimum 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 maximum and minimum temperature value.

The maximum and minimum temperature value can be reset using the **Maximum and minimum temperature reset** communication object (Data Point Type: 1.017 DPT_Trigger). When this object receives

a BUS telegram with the logical value “0” or “1”, the device automatically resets the maximum and minimum temperature to the current measured temperature, cancelling the previously saved values.

4.1.7 Measure unit

Used to set the measurement unit for coding and sending the information via the **Maximum measured temperature** and the **Minimum measured temperature** communication objects. The values that can be set are:

- **degrees Celsius (°C) (default value)**
- **degrees Kelvin (°K)**
- **degrees Fahrenheit (°F)**

The value set for this parameter changes the coding of the **Maximum measured temperature** and **Minimum measured temperature** communication objects: 9.001 *DPT_Value_Temp* if the value is **degrees Celsius (°C)**, 9.002 *DPT_Value_Tempd* if the value is **degrees Kelvin (°K)** and 9.027 *DPT_Value_Temp_F* if the value is **degrees Fahrenheit (°F)**.

4.1.8 Minimum temperature variation for sending value [$\pm 0.1^\circ\text{C}$]

This is visible if the maximum and minimum temperature values are sent on variation, and is used to define the minimum temperature variation (in relation to the last value sent) which causes the new measured value to be spontaneously sent. The values that can be set are:

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

4.1.9 Temperature sending period [minutes]

This is visible if the maximum and minimum temperature values are sent periodically, and is used to define the period after which the maximum and minimum measured temperature indication telegrams are sent spontaneously. The values that can be set are:

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

4.1.10 Temperature threshold X

The “**Temperature threshold 1**”, “**Temperature threshold 2**”, “**Temperature threshold 3**” and “**Temperature threshold 4**” parameters are used to activate the relative temperature thresholds and display the different configuration menus. The values that can be set are:

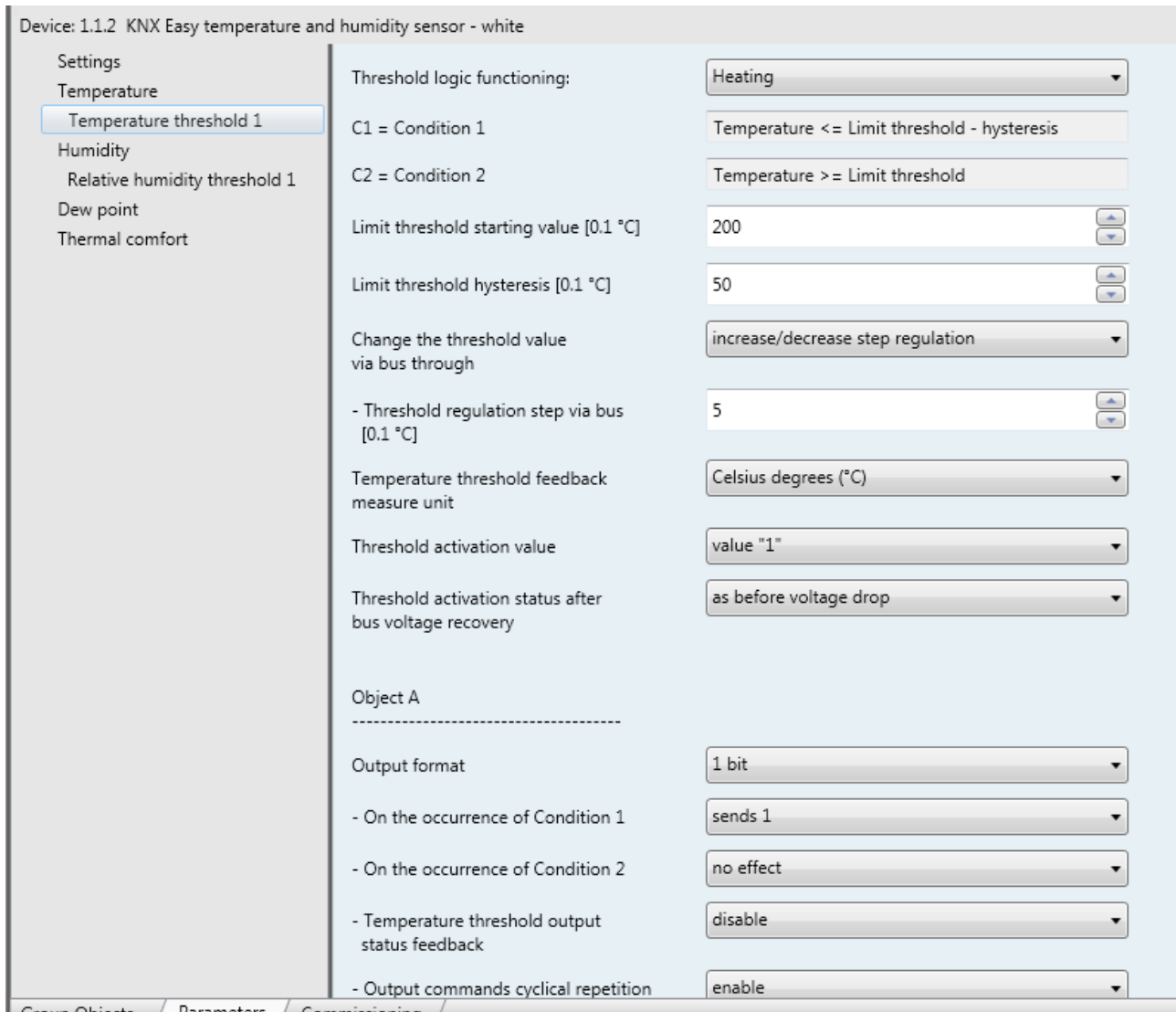
- **disable (default value)**
- **enable**

Selecting **enable** displays the configuration menu **Temperature threshold 1**, **Temperature threshold 2**, **Temperature threshold 3** and **Temperature threshold 4**, depending on the reference parameter.

5 “Temperature threshold X” menu

The device allows you to configure up to 4 temperature thresholds, associated with the sending of various BUS commands when the fixed threshold value is exceeded. All 4 thresholds are identical so, for the sake of simplicity, the operation and dedicated parameters are summarised in this paragraph, indicating the reference threshold with a general “x” (1 .. 4). The configuration menus are enabled by the relative parameter in the **Temperature** menu.

The structure of the menu is as follows:



Device: 1.1.2 KNX Easy temperature and humidity sensor - white

Settings

Temperature

Temperature threshold 1

Humidity

Relative humidity threshold 1

Dew point

Thermal comfort

Threshold logic functioning: Heating

C1 = Condition 1: Temperature <= Limit threshold - hysteresis

C2 = Condition 2: Temperature >= Limit threshold

Limit threshold starting value [0.1 °C]: 200

Limit threshold hysteresis [0.1 °C]: 50

Change the threshold value via bus through: increase/decrease step regulation

- Threshold regulation step via bus [0.1 °C]: 5

Temperature threshold feedback measure unit: Celsius degrees (°C)

Threshold activation value: value "1"

Threshold activation status after bus voltage recovery: as before voltage drop

Object A

Output format: 1 bit

- On the occurrence of Condition 1: sends 1

- On the occurrence of Condition 2: no effect

- Temperature threshold output status feedback: disable

- Output commands cyclical repetition: enable

Group Objects / Parameters / Commissioning

Fig. 5.1: “Temperature threshold X” menu

Via the **Temperature threshold x activation** (Data Point Type:1.002 DPT_Boolean) and **Temperature threshold x activation status** communication objects (Data Point Type:1.003 DPT_Enable), it is possible to receive threshold activation commands and send threshold activation feedback respectively. The **Temperature threshold x activation status** object can be sent following a request via the BUS, spontaneously with every variation in the threshold activation status and when the BUS voltage is restored. After an application download from ETS, the activated thresholds are enabled.

5.1 Parameters

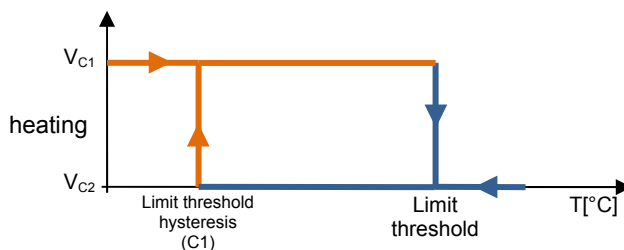
5.1.1 Threshold logic functioning

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:

- **heating** (default value)
- **cooling**

If **heating** is selected, the two conditions will be defined as follows:

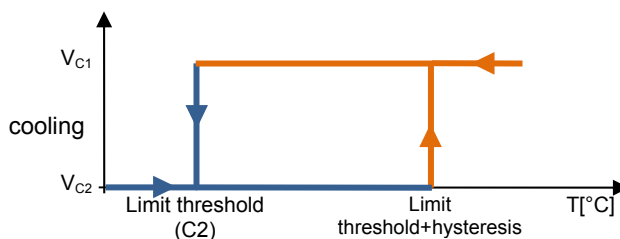
- Condition 1 = Measured temperature \leq Limit threshold – Hysteresis
- Condition 2 = Measured temperature \geq Limit threshold



When the measured temperature is lower than value C1 (limit threshold-hysteresis), the device will send the command associated with Condition 1; when the measured temperature reaches value C2 (limit threshold), the device will send the command associated with Condition 2.

If **cooling** is selected, the two conditions will be defined as follows:

- Condition 1 = Measured temperature \geq Limit threshold + Hysteresis
- Condition 2 = Measured temperature \leq Limit threshold



When the measured temperature is higher than value C1 (limit threshold+hysteresis), the device will send the command associated with Condition 1; when the measured temperature reaches value C2 (limit threshold), the device will send the command associated with Condition 2.

5.1.2 Limit threshold starting value [0.1°C]

Via the “**Limit threshold starting value [0.1°C]**” parameter, you can set the initial value of the limit threshold associated with the temperature threshold x (which can be changed via the BUS, using the specific communication object). The parameter may assume the following values:

- **from 0 to 400 in steps of 1 (default value 200)**

5.1.3 Limit threshold hysteresis [0.1°C]

The “**Limit threshold hysteresis [0.1°C]**” 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 100 in steps of 1 (default value 50)**

5.1.4 Change the threshold value via BUS through

The “Change the threshold value via bus through” parameter is used to define the format of the communication object necessary for setting the limit threshold via a BUS telegram.

The values that can be set are:

- **absolute value setting (°C) (default value)**
- **absolute value setting (°K)**
- **absolute value setting (°F)**
- **increase/decrease step regulation**

Selecting the value **absolute value setting** displays the **Temperature threshold x value input** communication object (Data Point Type: 9.001 DPT_Value_Temp if °C, 9.002 DPT_Value_Tempd if °K and 9.027 DPT_Value_Temp_F if °F), via which it is possible to set the value of the limit threshold via BUS.

Selecting **increase/decrease step regulation** displays the “**Threshold regulation step via bus [0.1°C]**” parameter and the **Temperature threshold x regulation** object (Data Point Type: 1.007 DPT_Step). If the value “1” is received on this object, the limit threshold value will be increased by the value defined by the “**Threshold regulation step via bus [0.1°C]**” parameter. If the value “0” is received on this object, the limit threshold value will be temporarily decreased by the value defined by the “**Threshold regulation step via bus [0.1°C]**” parameter.

5.1.5 Threshold regulation step via bus [0.1°C]

The “**Threshold regulation step via bus [0.1°C]**” parameter is used to define the increase/decrease step of the limit threshold value after receiving a command on the relative regulation object. The values that can be set are:

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

5.1.6 Temperature threshold feedback measure unit

The current value of the temperature threshold x is transmitted on the BUS via the **Temperature threshold feedback x** object. The “**Temperature threshold feedback measure unit**” parameter is used to set the measurement unit for coding and sending the information via the **Temperature threshold x feedback** communication object. The values that can be set are:

- **degrees Celsius (°C) (default value)**
- **degrees Kelvin (°K)**
- **degrees Fahrenheit (°F)**

The value set for this parameter changes the coding of the **Temperature threshold x feedback** communication object: 9.001 DPT_Value_Temp if the value is **degrees Celsius (°C)**, 9.002 DPT_Value_Tempd if the value is **degrees Kelvin (°K)** and 9.027 DPT_Value_Temp_F if the value is **degrees Fahrenheit (°F)**. The conditions for the spontaneous sending of feedback are: following a BUS request, spontaneously with each threshold change, and on BUS voltage resetting.

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** control algorithm for heating, 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 - 2 (default value)**
Setting the value **0** obtains the condition “ $\Delta T_{1 \text{ heat}} = \Delta T_{\text{valv}}$ ” for which the value of the speed 1 activation threshold is “setpoint- ΔT_{valv} ” and the off value is “setpoint”.

5.1.8 Value of threshold activation from bus

The “**Value of threshold activation from bus**” parameter determines which logical value received via the **Temperature threshold x activation** communication object activates the temperature threshold x. If the value opposite the one set for activation is received, this will deactivate the threshold. The possible values are:

- **value “0”**
- **value “1” (default value)**

5.1.9 Threshold activation status after bus voltage resetting

The “**Threshold activation status after bus voltage recovery**” parameter is used to set the status of the temperature threshold x after the BUS power supply voltage has been restored. The possible values are:

- **disabled**
- **enabled**
- **as before voltage drop (default value)**

5.1.9 Object A/B/C/D

For each threshold, you can send up to 4 different objects (distinguished by the letters A, B, C and D) depending on conditions 1 and 2. Object A is always enabled, whereas the “**Object Z**” parameter (where Z is the index of the object associated with the threshold, between **B** and **D**) can be used to enable a new object to be sent. The parameter may assume the following values:

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

Selecting **enable** displays the **Temperature threshold X output Z** object (where Z is the index of the object associated with the threshold, between **A** and **D**) and the “**Output format**”, “On the occurrence of condition 1”, “On the occurrence of condition 2” and “Temperature threshold output status feedback” parameters grouped in the Object Z sub-group (where Z is the index of the object associated with the channel, between A and D).

5.1.10 Output format

The “**Output format**” parameter is used to set the format and coding of the BUS telegram that will be sent by the device. The values that can be set are:

- **1 bit (default value)**
- **2 bit**
- **1 byte unsigned**
- **1 byte signed**
- **1 byte percentage**
- **1 byte HVAC**
- **2 byte unsigned**
- **2 byte signed**
- **2 byte setpoint in °C**
- **2 byte setpoint in °K**
- **2 byte setpoint in °F**

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.

5.1.11 On the occurrence of condition 1/2

On the basis of the format of the datapoint sent (specified in the **Output format** parameter), these two parameters can be used to indicate the values you want to transmit via the type of object chosen when condition 1 or 2 arises. Depending on the value set for these two parameters, other setting parameters (like those shown below) may be visualised.

- If the output format is **1 bit**, this displays the **Temperature threshold X output Z** communication object (Data Point Type: 1.001 DPT_Switch) and the “**Temperature threshold output status feedback**” parameter. The values that can be set for the two parameters listed above are:
 - **no effect - (default value on occurrence of cond 2)**
 - **send 0**
 - **send 1- (default value on occurrence of cond 1)**

The “**Temperature threshold output status feedback**” parameter is used to enable and display the **Temperature threshold X output Z status feedback** communication object (Data Point Type: 1.001 DPT_Switch). By enabling this object, the command on the **Temperature threshold X output Z** object will be repeated until the status received on the **Temperature threshold X output Z status feedback** object coincides with the command. Any possible repetition of the command will take place periodically, once a minute. The parameter may assume the following values:

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

Selecting **enable** displays the **Temperature threshold X output Z status feedback** communication object. In this case, every time the BUS voltage is restored you must send a status read request on this object (in order to update the interface about the status of the devices connected) if condition C1 or C2 has occurred (otherwise, no request is sent).

Selecting **disable** displays the “**Cyclical repetition of the output commands**” parameter.

- If the output format is **2 bit**, this displays the **Temperature threshold X output Z** communication object (Data Point Type: 2.001 DPT_Switch_Control). The values that can be set for the two parameters listed above are:
 - **no effect - (default value cond 2)**
 - **send forcing activation on (down) (default value cond 1)**
 - **send forcing activation off (up)**
 - **send deactivate forcing**
- If the output format is **1 byte unsigned value**, this displays the **Temperature threshold X output Z** communication object (Data Point Type: 5.010 DPT_Value_1_Ucount). The values that can be set for the two parameters listed above are:
 - **no effect - (default value cond 2)**
 - **send value (default value cond 1)**

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter “**Value (0 .. 255)**”, which can assume the following values:

- **from 0 (default value) to 255, in steps of 1**
- If the output format is **1 byte signed value**, this displays the **Temperature threshold X output Z** communication object (Data Point Type: 6.010 DPT_Value_1_Count). The values that can be set for the two parameters listed above are:

- **no effect -** (default value cond 2)
- **send value** (default value cond 1)

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter “**Value (-128 .. 127)**”, which can assume the following values:

- **from -128 to 127 in steps of 1 (default value 0)**
- If the output format is **1 byte percentage**, this displays the **Temperature threshold X output Z** communication object (Data Point Type: 5.001 DPT_Scaling). The values that can be set for the two parameters listed above are:
 - **no effect -** (default value cond 2)
 - **send value** (default value cond 1)

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter “**Value (0% .. 100%)**”, which can assume the following values:

- **from 0 (default value) to 100, in steps of 1**
- If the output format is **1 byte HVAC mode**, this displays the **Temperature threshold X output Z** communication object (Data Point Type: 20.102 DPT_HVACMode). The values that can be set for the two parameters listed above are:
 - **no effect - (default value cond 2)**
 - **send auto**
 - **send comfort - (default value cond 1)**
 - **send precomfort**
 - **send economy**
 - **send off (building protection)**
 - **send HVAC mode of reference \pm offset**

Selecting **send HVAC mode of reference \pm offset** displays the “**Offset (-3 .. +3)**” parameter and the **Reference for temperature threshold X output Z** communication object (Data Point Type: 20.102 DPT_HVACMode). In this case, the output value will be the HVAC mode received via the **Reference for temperature threshold X output Z** object to which the offset will be added (the order of the modes is: auto, comfort, precomfort, economy, off). If nothing was ever received on the reference object, the initial value is equal to “auto”.

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 or reference HVAC mode to obtain the value to be sent via the **Temperature threshold X output Z** object. The possible values are:

- **from -3 to +3 in steps of 1 (default value +1)**
- If the output format is **2 byte unsigned value**, this displays the **Temperature threshold X output Z** communication object (Data Point Type: 7.001 DPT_Value_2_Ucount). The values that can be set for the two parameters listed above are:
 - **no effect - (default value cond 2)**
 - **send value (default value cond 1)**

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter “**Value (0 .. 65535)**”, which can assume the following values:

- **from 0 (default value) to 65535, in steps of 1**
- If the output format is **2 byte signed value**, this displays the **Temperature threshold X output Z** communication object (Data Point Type: 8.001 DPT_Value_2_Count). The values that can be set for the two parameters listed above are:
 - **no effect - (default value cond 2)**
 - **send value (default value cond 1)**

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter “**Value (-32768 .. +32767)**”, which can assume the following values:

- **from -32768 to +32767 in steps of 1 (default value 0)**
- If the output format is **2 byte setpoint in °C**, this displays the **Temperature threshold X output Z** 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 - (default value cond 2)**
 - **send reference setpoint ± offset (default value cond 1)**

Selecting **send reference setpoint ± offset** displays the “**Offset [0.1°C] (-300 .. +300)**” parameter and the **Reference for temperature threshold X output Z** communication object (Data Point Type: 9.001 DPT_Value_Temp). In this case, the output value will be the setpoint received via the **Reference for temperature threshold X output Z** object to which the offset will be added. If nothing was ever received on the reference object, the initial value is equal to “20°C”.

The “**Offset [0.1°C] (-300 .. +300)**” parameter is used to set the offset to be applied to the current or reference setpoint to obtain the value to be sent via the **Temperature threshold X output Z** object. The possible values are:

- **from -300 to +300 in steps of 1 (default value +10)**
- If the output format is **2 byte setpoint in °K**, this displays the **Temperature threshold X output Z** communication object (Data Point Type: 9.002 DPT_Value_Tempd). The values that can be set for the two parameters listed above are:
 - **no effect (default value cond 2)**
 - **send reference setpoint + offset (default value cond 1)**

Selecting **send reference setpoint ± offset** displays the “**Offset [0.1°C] (-300 .. +300)**” parameter and the **Reference for temperature threshold X output Z** communication object (Data Point Type: 9.002 DPT_Value_Tempd). In this case, the output value will be the setpoint received via the **Reference for temperature threshold X output Z** object to which the offset will be added. If nothing was ever received on the reference object, the initial value is equal to “293°K”.

The “**Offset [0.1°C] (-300 .. +300)**” parameter is used to set the offset to be applied to the current or reference setpoint to obtain the value to be sent via the **Temperature threshold X output Z** object. The possible values are:

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

- If the output format is **2 byte setpoint in °F**, this displays the **Temperature threshold X output Z** communication object (Data Point Type: 9.027 DPT_Value_Temp_F). The values that can be set for the two parameters listed above are:

- **no effect** (default value cond 2)
- **send reference setpoint + offset** (default value cond 1)

Selecting **send reference setpoint ± offset** displays the “**Offset [0.1°C] (-300 .. +300)**” parameter and the **Reference for temperature threshold X output Z** communication object (Data Point Type: 9.027 DPT_Value_Temp_F). In this case, the output value will be the setpoint received via the **Reference for temperature threshold X output Z** object to which the offset will be added. If nothing was ever received on the reference object, the initial value is equal to “68°F”.

The “**Offset [0.1°C] (-300 .. +300)**” parameter is used to set the offset to be applied to the current or reference setpoint to obtain the value to be sent via the **Temperature threshold X output Z** object. The possible values are:

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

The **Temperature threshold X output Z** object is sent upon demand, spontaneously on a variation in the current condition (C1 or C2), periodically (if cyclical repetition is enabled) and when BUS voltage is restored only if condition C1 or C2 arises (otherwise, no value is sent). When the threshold is disabled, the sending of the telegrams associated with conditions C1 and C2 is inhibited, whereas any change or feedback of the threshold value is still carried out.

5.1.12 Output commands cyclical repetition

The “**Output commands cyclical repetition**” parameter is used to enable the periodic sending of the output value. The values that can be set are:

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

Selecting **enable** displays the “**Command repetition time**” parameter which is used to set the repetition time of the commands. The values that can be set are:

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

6 “Humidity” menu

The **Humidity** menu contains the parameters for configuring the functioning of the internal humidity sensor. The structure of the menu is as follows:

Device: 1.1.2 KNX Easy temperature and humidity sensor - white

Settings	Internal sensor correction factor [% RH]	0
Temperature	Relative humidity measured	send periodically
Temperature threshold 1	- Relative humidity value repetition time [minutes]	5
Humidity	Specific humidity	send in case of change
Relative humidity threshold 1	- Minimum variation for sending value	± 5 g/Kg
Dew point	Maximum and minimum relative humidity	send periodically
Thermal comfort	- Relative humidity value repetition time [minutes]	5
	Relative humidity threshold 1	enable
	Relative humidity threshold 2	disable
	Relative humidity threshold 3	disable
	Relative humidity threshold 4	disable

Fig. 6.1: “Humidity” menu

6.1 Parameters

6.1.1 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 probe. The values that can be set are:

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

6.1.2 Relative humidity measured

The “**Relative humidity measured**” parameter defines which event should trigger the sending of the **Relative humidity measured** object on the BUS (Data Point Type: 9.007 DPT_Value_Humidity). The parameter may assume the following values:

- *send on demand only*
- *send in case of change (default value)*
- *send periodically*
- *send in case of change and periodically*

Selecting **send in case of change** or **send in case of change and periodically** will display the “**Minimum variation for sending value [% RH]**” parameter, whereas selecting **send periodically** or **send in case of change and periodically** displays the “**Relative humidity value time [minutes]**” parameter.

Selecting **send on demand only**, no new parameter will be enabled, as the 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.

6.1.3 Minimum variation for sending value [% RH]

The “**Minimum variation for sending value**” parameter, displayed if the humidity is sent on variation, is used to define the minimum humidity variation (in relation to the last humidity value sent) which generates the spontaneous sending of the new measured value. The values that can be set are:

- $\pm 1\%$ 1
- $\pm 2\%$ 2
- $\pm 5\%$ 5 (default)
- $\pm 10\%$ 10

6.1.4 Relative humidity value time [minutes]

The “**Relative humidity value time [minutes]**” parameter, visible if the humidity is sent periodically, is used to define the period 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)*

6.1.5 Specific humidity

The device can calculate the specific humidity of the place where it is located. Follow these indications:

We refer to X specific humidity in kg / kg a.s. and, knowing that the vapour pressure equation is the following:

$$p_v = \frac{p \cdot X}{0.622 + X}$$

where $p = 101325$ Pa

we can obtain:

$$X = \frac{P_v \cdot 0.622}{p - P_v}$$

The “**Specific humidity**” parameter is used to define any special conditions for sending the specific humidity value measured via the **Specific humidity** object (Data Point Type: 14.005 DPT_Value_Amplitude). The parameter may assume the following values:

- *send on demand only*
- *send in case of change - (default value)*
- *send periodically*
- *send in case of change and periodically*

Selecting **send in case of change** or **send in case of change and periodically** displays the “**Minimum variation for sending value**” parameter, whereas selecting **send periodically** or **send in case of change and periodically** displays the “**Specific humidity time [minutes]**” parameter.

Selecting **send on demand only**, no new parameter will be enabled, as the humidity 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 specific humidity value.

6.1.6 Minimum variation for sending value

The “**Minimum variation for sending value**” parameter, displayed if the specific humidity is sent on variation, is used to define the minimum specific humidity variation with respect to the last specific humidity value that was sent, which generates the spontaneous sending of the new measured value. The values that can be set are:

- $\pm 1\text{g/kg}$
- $\pm 2\text{g/kg}$
- $\pm 5\text{g/kg}$ (default)
- $\pm 10\text{g/kg}$

6.1.7 Specific humidity value time [minutes]

The “**Specific humidity value time [minutes]**” parameter, visible if the specific humidity is sent periodically, is used to define the period with which the specific humidity feedback telegrams are sent spontaneously. The values that can be set are:

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

6.1.8 Maximum and minimum relative humidity

The “**Maximum and minimum relative humidity**” parameter is used to define the conditions for sending the *Maximum relative humidity measured* and *Minimum relative humidity measured* objects that transmit the maximum and minimum relative humidity value measured by the device up to that moment. The values that can be set are:

- *send on demand only*
- *send in case of change (default value)*
- *send periodically*
- *send in case of change and periodically*

Selecting **send in case of change** or **send in case of change and periodically** will display the “**Minimum variation for sending value [% RH]**” parameter, whereas selecting **send periodically** or **send in case of change and periodically** displays the “**Relative humidity value time [minutes]**” parameter.

Selecting **send on demand only**, no new parameter will be enabled, as the maximum and minimum relative humidity values are not sent spontaneously by the device (they are 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 maximum or minimum relative humidity value.

The maximum and minimum relative humidity value can be reset using the **Reset maximum and minimum relative humidity** communication object (Data Point Type: 1.017 DPT_Trigger). When this object receives a BUS telegram with the logical value “0” or “1”, the device automatically resets the maximum and minimum relative humidity values to the current measured relative humidity, cancelling the previously saved values.

6.1.9 Minimum humidity variation for sending value [% RH]

The “**Minimum humidity variation for sending value [% RH]**” parameter (which is visible if the maximum and minimum relative humidity values are sent following a change) is used to define the minimum 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)*

6.1.10 Relative humidity value sending time [minutes]

The “**Maximum and minimum relative humidity value sending time [minutes]**” parameter (which is visible if the maximum and minimum relative humidity values are sent periodically) is used to define the frequency with which the maximum and minimum 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)*

6.1.11 Relative humidity threshold 1/2/3/4

The “**Relative humidity threshold 1**”, “**Relative humidity threshold 2**”, “**Relative humidity threshold 3**” and “**Relative humidity threshold 4**” parameters are used to activate the respective relative humidity thresholds and display the various configuration menus. The values that can be set are:

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

Selecting **enable** will display the **Relative humidity threshold 1**, **Relative humidity threshold 2**, **Relative humidity threshold 3** and **Relative humidity threshold 4** configuration menus, according to the reference parameter.

7 “Relative humidity threshold X” menu

The device allows you to configure up to 4 relative humidity thresholds, associated with the sending of various BUS commands when the fixed threshold value is exceeded. All 4 thresholds are identical so, for the sake of simplicity, the operation and dedicated parameters are summarised in this paragraph, indicating the reference threshold with a general “x” (1 .. 4). The configuration menus are enabled by the relative parameter in the **Humidity** menu.

The structure of the menu is as follows:

Device: 1.1.2 KNX Easy temperature and humidity sensor - white

Settings	Threshold logic functioning:	humidification
Temperature	C1 = Condition 1	Relative humidity <= Limit threshold - hysteresis
Temperature threshold 1	C2 = Condition 2	Relative humidity >= Limit threshold
Humidity	Limit threshold starting value [% RH]	50
Relative humidity threshold 1	Limit threshold hysteresis [% RH]	5
Dew point	Change the threshold value via bus through	increase/decrease step
Thermal comfort	- Threshold regulation step via bus [%]	5
	Threshold activation value	value "1"
	Threshold activation status after bus voltage recovery	as before voltage drop
	Object A	

	Output format	1 bit
	- On the occurrence of Condition 1	sends 1
	- On the occurrence of Condition 2	no effect
	- Relative humidity threshold output status feedback	enable
	Object B	

		enable

Fig. 7.1: “Relative humidity threshold X” menu

Via the **Relative humidity threshold x activation** (Data Point Type:1.002 DPT_Boolean) and **Relative humidity threshold x activation status** (Data Point Type:1.003 DPT_Enable) communication objects, it is possible to receive threshold activation commands and send threshold activation status feedback respectively. The telegrams are sent via the **Relative humidity threshold x activation status** object following a request via the BUS, spontaneously with every variation in the threshold activation status, and when the BUS voltage is restored. After an application download from ETS, the activated thresholds are enabled.

The current value of the relative humidity threshold x is transmitted on the BUS via the **Relative humidity threshold x feedback** 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 BUS voltage is restored.

7.1 Parameters

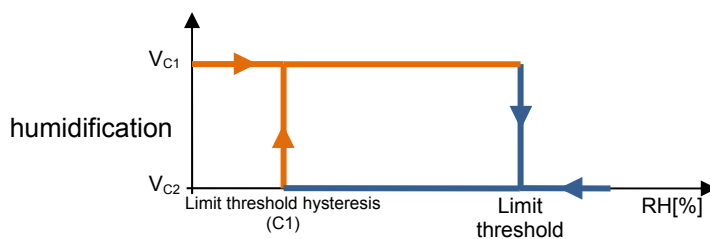
7.1.1 Threshold logic functioning

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)**
- **dehumidification**

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

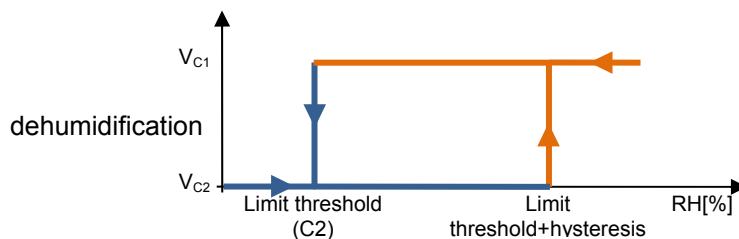
- Condition 1 = Relative humidity \leq Limit threshold – Hysteresis
- Condition 2 = Relative humidity \geq Limit threshold



When the relative humidity is lower than value C1 (Limit threshold - hysteresis), the device will send the command associated with Condition 1. When the relative humidity reaches value C2 (Limit threshold), the device sends the command associated with Condition 2.

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

- Condition 1 = Relative humidity \geq Limit threshold + Hysteresis
- Condition 2 = Relative humidity \leq Limit threshold



When the relative humidity is higher than value C1 (Limit threshold - hysteresis), the device will send the command associated with Condition 1. When the relative humidity reaches value C2 (Limit threshold), the device sends the command associated with Condition 2.

7.1.2 Limit threshold starting value [%UR]

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)**

7.1.3 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)*

7.1.4 Change the threshold value via bus through

The “**Change the threshold value via bus through**” parameter is used to define the format of the communication object necessary for setting the limit threshold via a BUS telegram. The values that can be set are:

- *absolute value* (default value)
- *increase/decrease step*

Selecting **absolute value** displays the object **Relative humidity threshold x input** (Data Point Type: 9.007 DPT_Value_Humidity) which is used to directly change the limit threshold.

Selecting **increase/decrease step** displays the “**Threshold regulation step via bus [%]**” parameter and the **Relative humidity threshold x regulation** object (Data Point Type: 1.007 DPT_Step).

If the value “1” is received on this object, the limit threshold value will be increased by the value defined by the “**Threshold regulation step via bus [%]**” parameter. If the value “0” is received on this object, the limit threshold value will be decreased temporarily by the value defined by the “**Threshold regulation step via bus [%]**” parameter.

7.1.5 Threshold regulation step via bus [%]

The **Threshold regulation step via bus [%]** parameter is used to define the increase/decrease step of the limit threshold value after receiving a command on the relative regulation object. The values that can be set are:

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

7.1.6 Value of threshold activation from bus

The “**Value of threshold activation from bus**” parameter determines which logical value received via the **Relative humidity threshold x activation** communication object should activate the relative humidity threshold x. If the value opposite the one set for activation is received, this will deactivate the threshold. The possible values are:

- *value “0”*
- *value “1”* (default value)

7.1.7 Threshold activation status after bus voltage resetting

The “**Threshold activation status after bus voltage recovery**” parameter is used to set the status of the relative humidity threshold x after the BUS power supply voltage is restored. The possible values are:

- *disabled*
- *enabled*
- *as before voltage drop* (default value)

7.1.8 Object A/B/C/D

For each threshold, you can send up to 4 different objects (distinguished by the letters A, B, C and D) depending on conditions 1 and 2. Object A is always enabled, whereas the “**Object Z**” parameter (where Z is the index of the object associated with the threshold, between **B** and **D**) can be used to enable a new object to be sent. The parameter may assume the following values:

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

Selecting **enable** displays the **Relative humidity threshold X output Z** object (where Z is the index of the object associated with the threshold, between **A** and **D**) and the “**Output format**”, “On the occurrence of condition 1”, “On the occurrence of condition 2” and “Temperature threshold output status feedback” parameters grouped in the Object Z sub-group (where Z is the index of the object associated with the channel, between **A** and **D**).

7.1.9 Output format

The “**Output format**” parameter is used to set the format and coding of the BUS telegram that will be sent by the device. The values that can be set are:

- **1 bit** (default value)
- **2 bit**
- **1 byte unsigned**
- **1 byte signed**
- **1 byte percentage**
- **1 byte HVAC**
- **2 byte unsigned**
- **2 byte signed**
- **2 byte setpoint in °C**
- **2 byte setpoint in °K**
- **2 byte setpoint in °F**

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.

7.1.10 On the occurrence of condition 1/2

On the basis of the format of the datapoint sent (specified in the **Output format** parameter), these two parameters can be used to indicate the values you want to transmit via the type of object chosen when condition 1 or 2 arises. Depending on the value set for these two parameters, other setting parameters (like those shown below) may be visualised.

- If the output format is **1 bit**, this displays the **Relative humidity threshold x output z** 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** (default value on occurrence of cond 2)
 - **send 0**
 - **send 1** (default value on occurrence of cond 1)

The “**Relative humidity threshold output status feedback**” parameter is used to enable and display the **Relative humidity threshold x output z status feedback** communication object (Data Point Type: 1.001 DPT_Switch). By enabling this object, the command on the **Relative humidity threshold x output z** object will be repeated until the status received on the **Relative humidity threshold x output z**

status feedback object coincides with the command. Any possible repetition of the command will take place periodically, once a minute. The parameter may assume the following values:

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

Selecting **enable** displays the **Relative humidity threshold x output status z feedback** communication object. In this case, every time the BUS voltage is restored you must send a status read request on this object (in order to update the interface about the status of the devices connected) if condition C1 or C2 has occurred (otherwise, no request is sent).

Selecting **disable** displays the “**Cyclical repetition of the output commands**” parameter.

- If the output format is **2 bit**, this displays the **Relative humidity threshold x output z** communication object (Data Point Type: 2.001 DPT_Switch_Control). The values that can be set for the two parameters listed above are:

- **no effect** (default value cond 2)
- **send forcing activation on (down)** (default value cond 1)
- **send forcing activation off (up)**
- **send deactivate forcing**

- If the output format is **1 byte unsigned value**, this displays the **Relative humidity threshold x output z** communication object (Data Point Type: 5.010 DPT_Value_1_Ucount). The values that can be set for the two parameters listed above are:

- **no effect** (default value cond 2)
- **send value** (default value cond 1)

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter “**Value (0 .. 255)**”, which can assume the following values:

- **from 0 (default value) to 255, in steps of 1**

- If the output format is **1 byte signed value**, this displays the **Relative humidity threshold x output z** communication object (Data Point Type: 6.010 DPT_Value_1_Count). The values that can be set for the two parameters listed above are:

- **no effect** (default value cond 2)
- **send value** (default value cond 1)

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter “**Value (-128 .. 127)**”, which can assume the following values:

- **from -128 to 127 in steps of 1 (default value 0)**

- If the output format is **1 byte percentage value**, this displays the **Relative humidity threshold x output z** communication object (Data Point Type: 5.001 DPT_Scaling). The values that can be set for the two parameters listed above are:

- **no effect** (default value cond 2)
- **send value (default value cond 1)**

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter “**Value (0% .. 100%)**”, which can assume the following values:

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

- If the output format is **1 byte HVAC mode**, this displays the **Relative humidity threshold x output z** communication object (Data Point Type: 20.102 DPT_HVACMode). The values that can be set for the two parameters listed above are:
 - **no effect** (default value cond 2)
 - **send auto**
 - **send comfort** (default value cond 1)
 - **send precomfort**
 - **send economy**
 - **send off (building protection)**
 - **send HVAC mode of reference ± offset**

Selecting **send HVAC mode of reference ± offset** displays the “**Offset (-3 .. +3)**” parameter and the **Reference for relative humidity threshold x output z** communication object (Data Point Type: 20.102 DPT_HVACMode). In this case, the output value will be the HVAC mode received via the **Reference for relative humidity threshold x for output z** object to which the offset will be added (the order of the modes is: auto, comfort, precomfort, economy, off). If nothing was ever received on the reference object, the initial value is equal to “auto”.

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 or reference HVAC mode to obtain the value to be sent via the **Relative humidity threshold x output z** object. The possible values are:

- **from -3 to +3 in steps of 1 (default value +1)**
- If the output format is **2 byte unsigned value**, this displays the **Relative humidity threshold x output z** communication object (Data Point Type: 7.001 DPT_Value_2_Ucount). The values that can be set for the two parameters listed above are:
 - **no effect** (default value cond 2)
 - **send value** (default value cond 1)

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter “**Value (0 .. 65535)**”, which can assume the following values:

- **from 0 (default value) to 65535, in steps of 1**
- If the output format is **2 byte signed value**, this displays the **Relative humidity threshold x output z** communication object (Data Point Type: 8.001 DPT_Value_2_Count). The values that can be set for the two parameters listed above are:
 - **no effect** (default value cond 2)
 - **send value** (default value cond 1)

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter “**Value (-32768 .. +32767)**”, which can assume the following values:

- **from -32768 to +32767 in steps of 1 (default value 0)**

- If the output format is **2 byte setpoint in °C**, this displays the **Relative humidity threshold x output z** 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** (default value cond 2)
- **send reference setpoint ± offset** (default value cond 1)

Selecting **send reference setpoint ± offset** displays the “**Offset [0.1°C] (-300 .. +300)**” parameter and the **Reference for relative humidity threshold x output z** communication object (Data Point Type: 9.001 DPT_Value_Temp). In this case, the output value will be the setpoint received via the **Reference for relative humidity threshold x output z** object to which the offset will be added. If nothing was ever received on the reference object, the initial value is equal to “20°C”.

The “**Offset [0.1°C] (-300 .. +300)**” parameter is used to set the offset to be applied to the current or reference setpoint to obtain the value to be sent via the **Temperature threshold X output Z** object. The possible values are:

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

- If the output format is **2 byte setpoint in °K**, this displays the **Relative humidity threshold x output z** communication object (Data Point Type: 9.002 DPT_Value_Tempd). The values that can be set for the two parameters listed above are:

- **no effect** (default value cond 2)
- **send reference setpoint + offset** (default value cond 1)

Selecting **send reference setpoint ± offset** displays the “**Offset [0.1°C] (-300 .. +300)**” parameter and the **Reference for relative humidity threshold x output z** communication object (Data Point Type: 9.002 DPT_Value_Tempd). In this case, the output value will be the setpoint received via the **Reference for relative humidity threshold x output z** object to which the offset will be added. If nothing was ever received on the reference object, the initial value is equal to “293°K”.

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

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

- If the output format is **2 byte setpoint in °F**, this displays the **Relative humidity threshold x output z** communication object (Data Point Type: 9.027 DPT_Value_Temp_F). The values that can be set for the two parameters listed above are:

- **no effect** (default value cond 2)
- **send reference setpoint + offset** (default value cond 1)

Selecting **send reference setpoint ± offset** displays the “**Offset [0.1°C] (-300 .. +300)**” parameter and the **Reference for relative humidity threshold x output z** communication object (Data Point Type: 9.027 DPT_Value_Temp_F). In this case, the output value will be the setpoint received via the **Reference for relative humidity threshold x output z** object to which the offset will be added. If nothing was ever received on the reference object, the initial value is equal to “68°F”.

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

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

The **Relative humidity threshold x output z** object is sent upon demand, spontaneously on variation of the current condition (C1 or C2), periodically (if cyclical repetition is enabled), and when BUS voltage is restored only if condition C1 or C2 has occurred (otherwise, no value is sent). When the threshold is disabled, the sending of the telegrams associated with conditions C1 and C2 is inhibited, whereas any change or feedback of the threshold value is still carried out.

7.1.11 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 frequency for repeating the commands. The values that can be set are:

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

8 “Dew point” menu

The **Dew point** menu contains parameters used to enable and configure the dew point temperature derived from the measurement of the measured relative humidity.

The structure of the menu is as follows:

Device: 1.1.2 KNX Easy temperature and humidity sensor - white

Settings	Dew point temperature	send in case of change
Temperature	- Feedback measure unit	Celsius degrees (°C)
Temperature threshold 1	- Minimum variation for sending value [± 0.1 °C]	5
Humidity		
Relative humidity threshold 1		
Dew point	Dew point temperature alarm feedback threshold	enable
Thermal comfort	Alarm threshold = Dew point temperature + Feedback limit	
	- Alarm feedback limit [tenths of °C]	50
	- Alarm feedback limit regulation step via bus [0.1°C]	5
	- Alarm threshold hysteresis [tenths of °C]	10
	- Alarm threshold feedback measure unit	Celsius degrees (°C)
	- Threshold activation value	value "1"
	- Alarm threshold activation status after bus voltage recovery	as before voltage drop
	- Output format	1 bit
	-- If Measure temperature < Threshold temperature	sends 1
	-- If Measure temperature > Threshold temperature + Hysteresis	no effect

Fig. 8.1: “Dew point” menu

Given a certain concentration of water in the air (defined as specific humidity X), the dew point temperature is the temperature at which saturation is reached (i.e. when relative humidity reaches 100%).

Specific humidity is directly linked with the dew temperature T_R via a table, so we can suppose there is a function of the $T_R = f(X)$ type.

Once you know the coefficients of the polynomial that estimates the function, you can obtain the dew temperature starting from the specific humidity value.

In this specific case, the estimate polynomial is:

$$-21.8797827705 \ 8831.8777713411 * X - 1056317.67502894 * X^2 + 81658587.5914781 * X^3 - 3592767185.52528 * X^4 + 82052448688.112 * X^5 - 753429044352.0 * X^6$$

8.1 Parameters

8.1.1 Dew point temperature

The “**Dew point temperature**” parameter is used to define the conditions for sending the estimated dew point temperature, calculated on the basis of the measured relative humidity, via the **Dew point temperature object**. The values that can be set are:

- **send on demand only**
- **send in case of change (default value)**
- **send periodically**
- **send in case of change and periodically**

Selecting the value **send in case of change** or **send in case of change and periodically**, the “**Minimum variation for sending value [$\pm 0.1^{\circ}\text{C}$]**” parameter will also be visible, whereas by selecting **send periodically** or **send in case of change and periodically**, the “**Feedback sending time [minutes]**” parameter will be visible.

Selecting the value **send on demand only**, no new parameter will be enabled, as the dew point 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 dew point temperature value.

8.1.2 Feedback measure unit

The “**Feedback measure unit**” parameter is used to set the measurement unit for coding and sending the information via the **Dew point temperature** communication object. The values that can be set are:

- **degrees Celsius ($^{\circ}\text{C}$) (default value)**
- **degrees Kelvin ($^{\circ}\text{K}$)**
- **degrees Fahrenheit ($^{\circ}\text{F}$)**

The value set for this parameter changes the coding of the **Dew point temperature** communication object: *9.001 DPT_Value_Temp* if the value is **degrees Celsius ($^{\circ}\text{C}$)**, *9.002 DPT_Value_Tempd* if the value is **degrees Kelvin ($^{\circ}\text{K}$)** and *9.027 DPT_Value_Temp_F* if the value is **degrees Fahrenheit ($^{\circ}\text{F}$)**.

8.1.3 Minimum variation for sending value [$\pm 0.1^{\circ}\text{C}$]

The “**Minimum variation for sending value [$\pm 0.1^{\circ}\text{C}$]**” parameter, visible if the dew point temperature is sent on variation, defines the minimum temperature variation (in relation to the last temperature value sent) for generating the spontaneous sending of the new value measured. The values that can be set are:

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

8.1.4 Feedback repetition time [minutes]

The “**Feedback sending time [minutes]**” parameter, visible if the dew point temperature is sent periodically, defines the time gap for spontaneously sending the measured temperature feedback telegrams. The values that can be set are:

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

8.1.5 Dew point temperature alarm feedback threshold

The “**Dew point temperature alarm feedback threshold**” parameter is used to enable the configuration of an alarm threshold for sending a BUS command when the fixed value is exceeded. The parameter may assume the following values:

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

Selecting **enable** displays the **Dew point temperature alarm limit regulation** (Data Point Type: 1.007 DPT_Step), **Dew point temperature alarm feedback threshold**, **Dew point temperature alarm output communication objects** and the “**Alarm feedback limit [tenths of °C]**”, “**Alarm feedback limit regulation step bus [0.1°C]**”, “**Alarm threshold hysteresis [tenths of °C]**”, “**Alarm threshold feedback measure unit**”, “**Enable/disable the alarm threshold via bus**” and “**Output format**” parameters.

8.1.6 Alarm threshold feedback measure unit

The “**Alarm threshold feedback measure unit**” parameter is used to set the measurement unit for coding and sending the information via the **Dew point temperature alarm feedback threshold** communication object. The values that can be set are:

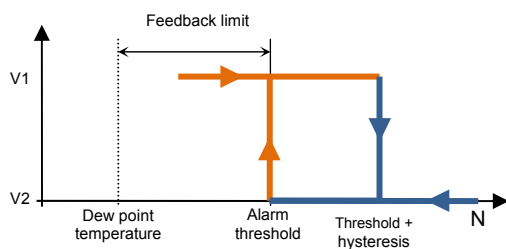
- **degrees Celsius (°C) (default value)**
- **degrees Kelvin (°K)**
- **degrees Fahrenheit (°F)**

The value set for this parameter changes the coding of the **Dew point temperature alarm feedback threshold** communication object: *9.001 DPT_Value_Temp* if the value is **degrees Celsius (°C)**, *9.002 DPT_Value_Tempd* if the value is **degrees Kelvin (°K)** and *9.027 DPT_Value_Temp_F* if the value is **degrees Fahrenheit (°F)**. The conditions for spontaneously sending the feedback are every time the feedback limit via BUS is changed and each time the alarm threshold changes at least 0.5°C in comparison to the last value sent.

The alarm threshold is calculated as follows:

Threshold alarm = Dew point temperature + Feedback limit

This means the alarm threshold depends on two variables: the dew point temperature and the feedback limit.



8.1.7 Alarm feedback limit [tenths of °C]

The purpose of the feedback limit is to identify the approach of the dew point temperature, defining when the command associated with the dew point temperature alarm must be sent (i.e. how far ahead of the moment when the dew point temperature is actually reached). The initial value of the limit is defined via the “**Alarm feedback limit [tenths of °C]**” parameter, which can assume the following values:

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

The alarm feedback limit can be changed by the BUS via the **Dew point temperature alarm limit regulation** object (Data Point Type: 1.007 DPT_Step). If the value “1” is received on this object, the limit value will be increased by the value defined by the “**Alarm feedback limit regulation step via bus [0.1°C]**”

parameter. If the value “0” is received on this object, the limit value will be decreased by the value defined by the “**Alarm feedback limit regulation step via bus [0.1°C]**” parameter.

8.1.8 Alarm feedback limit regulation step via bus [0.1°C]

The “**Alarm feedback limit regulation step via bus [0.1°C]**” parameter is used to define the increase/decrease step of the value of the feedback limit after receiving a command on the relative regulation object. The values that can be set are

- *from 1 to 100 in steps of 1 (default value 5)*

8.1.9 Alarm threshold hysteresis [tenths of °C]

The “**Alarm threshold hysteresis [tenths of °C]**” parameter is used to set the hysteresis value that, when added to the feedback limit, helps define the end condition of the dew point temperature alarm and the subsequent sending of the associated command. This parameter may assume the following values:

- *from 1 to 20 in steps of 1 (default value 10)*

8.1.10 Value of threshold activation from bus

Via the **Dew point temperature alarm activation** (Data Point Type:1.002 DPT_Boolean) and **Dew point temperature alarm activation status** (Data Point Type:1.003 DPT_Enable) communication objects, it is possible to receive threshold activation commands and send threshold activation status feedback respectively. The telegrams are sent via the **Dew point temperature alarm activation status** object following a request via the BUS, spontaneously with every variation in the threshold activation status, and when the BUS voltage is restored.

The threshold is activated following a download of the ETS application software.

The “**Threshold activation value**” parameter determines which logical value received via the **Dew point temperature alarm activation** communication object activates the dew point temperature alarm threshold. If the value opposite the one set for activation is received, this will deactivate the threshold. The possible values are:

- *value “0”*
- *value “1” (default value)*

8.1.11 Alarm threshold activation status after bus voltage resetting

The “**Alarm threshold activation status after bus voltage resetting**” parameter is used to set the status of the dew point temperature alarm threshold after the BUS power supply voltage is restored. The possible values are:

- *disabled*
- *enabled*
- *as before voltage drop* (default value)

8.1.12 Output format

The “**Output format**” parameter is used to choose the format of the object to be sent in one of the two conditions. The values that can be set are:

- *1 bit*
- *2 bit*
- *1 byte unsigned*

- **1 byte signed**
- **1 byte percentage**
- **1 byte HVAC**
- **2 byte unsigned**
- **2 byte signed**

Depending on the value set for this item, the values that can be set for the “**If measured temperature < Threshold temperature**” and “**If measured temperature > Threshold temperature + hysteresis**” parameters will change.

- If the format of the object to send is **1 bit**, the **Dew point temperature alarm output** communication object will be visible (Data Point Type: 1.001 DPT_Switch). The values that can be set for the two parameters listed above are:
 - **no effect** (default value for $T_{Mes} > T_{Threshold} + Hysteresis$)
 - **1**
 - **2** (default value for $T_{Mes} < T_{Threshold}$)
- If the format of the object to send is **2 bit**, the **Dew point temperature alarm output** communication object will be visible (Data Point Type: 2.001 DPT_Switch_Control). The values that can be set for the two parameters listed above are:
 - **no effect** (default value $T_{Mes} > T_{Threshold} + Hysteresis$)
 - **send forcing activation on (down)** (default value $T_{Mes} < T_{Threshold}$)
 - **send forcing activation off (up)**
 - **deactivate forcing [=forcing deactivation]**
- If the format of the object to send is **1 byte unsigned value**, the **Dew point temperature alarm output** communication object will be visible (Data Point Type: 5.010 DPT_Value_1_Ucount). The values that can be set for the two parameters listed above are:
 - **no effect** (default value $T_{Mes} > T_{Threshold} + Hysteresis$)
 - **send value** (default value $T_{Mes} < T_{Threshold}$)

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter **Px “Value (0 .. 255)”**, which can assume the following values:

- **from 0 (default value) to 255, in steps of 1**
- If the format of the object to send is **1 byte signed value**, the **Dew point temperature alarm output** communication object will be visible (Data Point Type: 6.010 DPT_Value_1_Count). The values that can be set for the two parameters listed above are:
 - **no effect** (default value $T_{Mes} > T_{Threshold} + Hysteresis$)
 - **send value** (default value $T_{Mes} < T_{Threshold}$)

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter **Px “Value (-128 .. 127)”**, which can assume the following values:

- **from -128 to 127 in steps of 1 (default value 0)**
- If the format of the object to send is **1 byte percentage value**, the **Dew point temperature alarm output** communication object will be visible (Data Point Type: 5.001 DPT_Scaling). The values that can be set for the two parameters listed above are:
 - **no effect** (default value $T_{Mes} > T_{Threshold} + Hysteresis$)
 - **send value** (default value $T_{Mes} < T_{Threshold}$)

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter **Px** “**Value (0% .. 100%)**”, which can assume the following values:

- **from 0 (default value) to 100, in steps of 1**
- If the format of the object to send is **1 byte HVAC mode**, the **Dew point temperature alarm output** communication object will be visible (Data Point Type: 20.102 DPT_HVACMode). The values that can be set for the two parameters listed above are:
 - **no effect** (default value $T_{Mes} > T_{Threshold} + Hysteresis$)
 - **auto**
 - **comfort** (default value $T_{Mes} < T_{Threshold}$)
 - **pre-comfort**
 - **economy**
 - **off (building protection)**
- If the format of the object to send is **2 byte unsigned value**, the **Dew point temperature alarm output** communication object will be visible (Data Point Type: 7.001 DPT_Value_2_Ucount). The values that can be set for the two parameters listed above are:
 - **no effect** (default value $T_{Mes} > T_{Threshold} + Hysteresis$)
 - **send value** (default value $T_{Mes} < T_{Threshold}$)

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter **Px** “**Value (0 .. 65535)**”, which can assume the following values:

- **from 0 (default value) to 65535, in steps of 1**
- If the format of the object to send is **2 byte signed value**, the **Dew point temperature alarm output** communication object will be visible (Data Point Type: 8.001 DPT_Value_2_Count). The values that can be set for the two parameters listed above are:
 - **no effect** (default value $T_{Mes} > T_{Threshold} + Hysteresis$)
 - **send value** (default value $T_{Mes} < T_{Threshold}$)

By setting **send value**, it is possible to define the value to be sent via the newly displayed parameter **Px** “**Value (-32768 .. +32767)**”, which can assume the following values:

- **from -32768 to +32767 in steps of 1 (default value 0)**

8.1.13 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 frequency for repeating the command. The values that can be set are:

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

9 “Thermal comfort” menu

The **Thermal comfort** menu contains parameters used to enable and configure the thermal comfort feedback of the environment derived from the measurement of the relative humidity and the measured temperature.

The structure of the menu is as follows:

Device: 1.1.2 KNX Easy temperature and humidity sensor - white

Settings	Enable thermal comfort status feedback	enable
Temperature	- Logical value associated with the seasons	1 = summer / 0 = winter
Temperature threshold 1	- Season active after an ETS download	summer
Humidity	Limit conditions for comfort environment in the summer:	
Relative humidity threshold 1	Maximum temperature [0.1 °C]	260
Dew point	Minimum temperature [0.1 °C]	240
Thermal comfort	Maximum relative humidity [% RH]	60
	Minimum relative humidity [% RH]	40
	Maximum specific humidity [% RH]	115
	Limit conditions for comfort environment in the winter:	
	Maximum temperature [0.1 °C]	220
	Minimum temperature [0.1 °C]	180
	Maximum relative humidity [% RH]	60
	Minimum relative humidity [% RH]	40

Fig. 9.1: “Thermal comfort” menu

9.1 Parameters

9.1.1 Enable thermal comfort status feedback

The “**Enable thermal comfort status**” parameter is used to enable the function, making the configuration parameters visible. The possible values are:

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

Selecting **enable** displays all the objects and parameters relative to the thermal comfort feedback function.

9.1.2 Logical value associated with the seasons

To determine the thermal comfort status, it is necessary to know whether the current season is summer or winter; you can obtain this information via the **Season selection input** (Data Point Type 1.002 DPT_Bool) object.

The “**Logical value associated with the seasons**” parameter defines which logical value (received via the **Season selection input** communication object) is associated with summer and with winter. The possible values are:

- **1 = winter / 0 = summer**
- **1 = summer / 0 = winter** **(default value)**

9.1.3 Season active after an ETS download

The “**Season active after an ETS download**” parameter is used to preselect the season to be set after an ETS download. The possible values are:

- **summer -** **(default value)**
- **winter**

The setting is valid until a value is received on the **Season selection input** object.

Limit conditions for comfort environment in the summer/winter, and thermal comfort status feedback

The environment comfort condition depends on the current relative humidity and temperature value; if both of the current values for these two variables lie within the limit values, then the environment is defined as “comfortable”.

For summer and for winter, the limit temperature and humidity values must be defined in order to define the environment as “comfortable”. Once the limit values are defined, the environment is comfortable if all the three conditions indicated below are observed:

- Minimum temperature \leq Current temperature \leq Maximum temperature
- Minimum relative humidity \leq Current relative humidity \leq Maximum relative humidity
- Current specific humidity \leq Maximum specific humidity

The **Thermal comfort status feedback** object (Data Point Type 1.002 DPT_Bool) is used to send the comfort status of the environment in which the device is installed on the BUS. If the three conditions have all been respected (comfortable environment), the object takes the logical value “1”; otherwise, the value is “0”. The value of the object is sent on demand, spontaneously with a variation, and when the BUS voltage is restored.

Given that the parameters for setting the limit values to define a state of thermal comfort are the same for both summer and winter (i.e. what changes is just the range of values that can be set), the following explanation of the parameters holds true for both sections (“**Limit conditions for comfort environment in the summer**” and “**Limit conditions for comfort environment in the winter**”).

9.1.4 Maximum temperature [0.1°C]

The maximum temperature in summer or winter (depending on the subgroup to which the parameter belongs) is defined via the “**Maximum temperature [0.1°C]**” parameter, which can assume the following values:

- **from 200 to 400 in steps of 1 (default value for summer 260, default value for winter 220)**

9.1.5 Minimum temperature [0.1°C]

The minimum temperature in summer or winter (depending on the subgroup to which the parameter belongs) is defined via the “**Minimum temperature [0.1°C]**” parameter, which can assume the following values:

- *from 200 to 400 in steps of 1 (default value for summer 240, default value for winter 180)*

9.1.6 Maximum relative humidity (% RH)

The maximum relative humidity in summer or winter (depending on the subgroup to which the parameter belongs) is defined via the “**Maximum relative humidity [°RH]**” parameter, which can assume the following values:

- *from 50 to 95 in steps of 1 (default value 60)*

9.1.7 Minimum relative humidity (% RH)

The minimum relative humidity in summer or winter (depending on the subgroup to which the parameter belongs) is defined via the “**Minimum relative humidity [°RH]**” parameter, which can assume the following values:

- *from 10 to 45 in steps of 1 (default value 40)*

9.1.8 Maximum specific humidity [0.1g/kg]

The specific maximum humidity in summer or winter (depending on the subgroup to which the parameter belongs) is defined via the “**maximum specific humidity [0.1 g/kg]**” parameter, which can assume the following values:

- *from 50 to 220 in steps of 1 (default value 115)*

10 Communication objects

The communication objects implemented in the device are shown in the following table:

Output objects:

#	Object name				Object function	Description	Datapoint type
0	Measured temperature				Value °C	Sends temperature values in degrees Celsius calculated by device	9.001 DPT_Temp
0	Measured temperature				Value °K	Sends temperature values in degrees Kelvin calculated by device	9.002 DPT_Tempd
0	Measured temperature				Value °F	Sends temperature values in degrees Fahrenheit calculated by device	9.027 DPT_Temp_F
1	Measured relative humidity				Value [% RH]	Sends the relative humidity values calculated by the device	9.007 DPT_Value_Humidity
3	5	7	9	Temperature threshold 1 feedback	Value °C	Sends temperature values in degrees Celsius calculated by device	9.001 DPT_Temp
3	5	7	9	Temperature threshold 1 feedback	Value °K	Sends temperature values in degrees Kelvin calculated by device	9.002 DPT_Tempd
3	5	7	9	Temperature threshold 1 feedback	Value °F	Sends temperature values in degrees Fahrenheit calculated by device	9.027 DPT_Temp_F
11	13	15	17	Relative humidity threshold x feedback	Value % RH	Sends the relative humidity threshold x current value	9.007 DPT_Value_Humidity
21	25	29	33	Temperature threshold x output A	Value 1/0	Sends the values 1/0 associated with the output A of temperature threshold x	1.001 DPT_Switch
21	25	29	33	Temperature threshold x output A	On/Off forced positioning	Sends the 2 bit values associated with the output A of temperature threshold x	2.001 DPT_Switch_Control
21	25	29	33	Temperature threshold x output A	Temperature threshold x output A	Sends the unsigned values (0..255) associated with the output A of temperature threshold x	5.010 DPT_Value_1_Ucount
21	25	29	33	Temperature threshold 2 output A	Value -128.. +127	Sends the signed values (-128..127) associated with the output A of temperature threshold x	6.010 DPT_Value_1_Count
21	25	29	33	Temperature threshold 2 output A	Value 0% .. 100%	Sends the percentage values (0%..100%) associated with the output A of temperature threshold x	5.001 DPT_Percentage
21	25	29	33	Temperature threshold 2 output A	HVAC Mode (com/precom/eco/off)	Sends the HVAC Mode values (comfort/precomfort/economy/off) associated with the output A of temperature threshold x	20.102 DPT_HVAC_Mode
21	25	29	33	Temperature threshold x output A	Value 0..65535	Sends the unsigned values (0..65535) associated with the output A of temperature threshold x	7.001 DPT_Value_2_Ucount
21	25	29	33	Temperature threshold x output A	Value -32768..32767	Sends the signed values (-32768..32767) associated with the output A of temperature threshold x	8.001 DPT_Value_2_Count
21	25	29	33	Temperature threshold x output A	Setpoint value [°C]	Sends the setpoint values (°C) associated with the output A of temperature threshold x	9.001 DPT_Value_Temp
21	25	29	33	Temperature threshold x output A	Setpoint value [°K]	Sends the setpoint values (°K) associated with the output A of temperature threshold x	9.002 DPT_Value_Tempd
21	25	29	33	Temperature threshold x output A	Setpoint value [°F]	Sends the setpoint values (°F) associated with the output A of temperature threshold x	9.027 DPT_Value_Temp_F
37	41	45	49	Relative humidity threshold x output A	1/0 value	Sends the values 1/0 associated with the output A of relative humidity threshold x	1.001 DPT_Switch
37	41	45	49	Relative humidity threshold x output A	On/Off forced positioning	Sends the 2 bit values associated with the output A of relative humidity threshold x	2.001 DPT_Switch_Control
37	41	45	49	Relative humidity threshold x output A	Value 0..255	Sends the unsigned values	5.010

				output A		(0..255) associated with the output A of relative humidity threshold x	DPT_Value_1_Ucount
37	41	45	49	Relative humidity threshold x output A	Value -128.. +127	Sends the signed values (-128..127) associated with the output A of relative humidity threshold x	6.010 DPT_Value_1_Count
37	41	45	49	Relative humidity threshold x output A	Value 0% .. 100%	Sends the percentage values (0%..100%) associated with the output A of relative humidity threshold x	5.001 DPT_Percentage
37	41	45	49	Relative humidity threshold x output A	HVAC Mode (com/precom/eco/off)	Sends the HVAC Mode values (comfort/precomfort/economy/off) associated with the output A of relative humidity threshold x	20.102 DPT_HVAC_Mode
37	41	45	49	Relative humidity threshold x output A	Value 0..65535	Sends the unsigned values (0..65535) associated with the output A of relative humidity threshold x	7.001 DPT_Value_2_Ucount
37	41	45	49	Relative humidity threshold x output A	Value 32768..32767	Sends the signed values (-32768..32767) associated with the output A of relative humidity threshold x	8.001 DPT_Value_2_Count
37	41	45	49	Relative humidity threshold x output A	Setpoint value [°C]	Sends the setpoint values (°C) associated with the output A of relative humidity threshold x	9.001 DPT_Value_Temp
37	41	45	49	Relative humidity threshold x output A	Setpoint value [°K]	Sends the setpoint values (°K) associated with the output A of relative humidity threshold x	9.002 DPT_Value_Tempd
37	41	45	49	Relative humidity threshold x output A	Setpoint value [°F]	Sends the setpoint values (°F) associated with the output A of relative humidity threshold x	9.027 DPT_Value_Temp_F
53	65	77	89	Temperature threshold x output B	1/0 value	Sends the values 1/0 associated with the output B of temperature threshold x	1.001 DPT_Switch
57	69	81	93	Temperature threshold x output C	1/0 value	Sends the values 1/0 associated with the output C of temperature threshold x	1.001 DPT_Switch
61	73	84	97	Temperature threshold x output D	1/0 value	Sends the values 1/0 associated with the output D of temperature threshold x	1.001 DPT_Switch
101	113	125	137	Relative humidity threshold x output B	1/0 value	Sends the values 1/0 associated with the output B of relative humidity threshold x	1.001 DPT_Switch
105	117	129	141	Relative humidity threshold x output C	1/0 value	Sends the values 1/0 associated with the output C of relative humidity threshold x	1.001 DPT_Switch
109	121	133	145	Relative humidity threshold x output D	1/0 value	Sends the values 1/0 associated with the output D of relative humidity threshold x	1.001 DPT_Switch
147	149	151	153	Temperature threshold 1 enabling status	Enabled/Disabled	Sends temperature threshold x enabling status	1.003 DPT_Enable
155	157	159	161	Relative humidity threshold 1 enabling status	Enabled/Disabled	Sends relative humidity threshold x enabling status	1.003 DPT_Enable
163	Dew point temperature alarm enabling status			Enabled/Disabled	Sends dew point temperature alarm threshold enabling status	1.003 DPT_Enable	
165	Dew point temperature alarm threshold feedback			Value in °C	Sends the dew point temperature alarm threshold actual values (°C)	9.001 DPT_Value_Temp	
165	Dew point temperature alarm threshold feedback			Value in °K	Sends the dew point temperature alarm threshold actual values (°K)	9.002 DPT_Value_Tempd	
165	Dew point temperature alarm threshold feedback			Value in °F	Sends the dew point temperature alarm threshold actual values (°F)	9.027 DPT_Value_Temp_F	
166	Dew point temperature alarm output			1/0 value	Sends the values 1/0 associated with dew point temperature alarm	1.001 DPT_OnOff	
166	Dew point temperature alarm output			On/Off forced positioning	Sends the 2 bit values associated with dew point temperature alarm	2.001 DPT_Switch_Control	
166	Dew point temperature alarm output			Value 0..255	Sends the unsigned values (0..255) associated with dew point temperature alarm	5.010 DPT_Value_1_Ucount	
166	Dew point temperature alarm output			Value -128.. +127	Sends the signed values (-128..127) associated with dew point temperature alarm	6.010 DPT_Value_1_Count	

166	Dew point temperature alarm output	Value 0% .. 100%	Sends the percentage values (0%..100%) associated with dew point temperature alarm	5.001 DPT_Percentage
166	Dew point temperature alarm output	HVAC Mode (com/precom/eco/off)	Sends the HVAC Mode values (comfort/precomfort/economy/off) associated with dew point temperature alarm	20.102 DPT_HVAC_Mode
166	Dew point temperature alarm output	Value 0..65535	Sends the unsigned values (0..65535) associated with dew point temperature alarm	7.001 DPT_Value_2_Ucount
166	Dew point temperature alarm output	Value -32768..32767	Sends the signed values (-32768..32767) associated with dew point temperature alarm	8.001 DPT_Value_2_Count
167	Dew point temperature	Value in °C	Sends the dew point temperature values (°C)	9.001 DPT_Value_Temp
167	Dew point temperature	Value in °K	Sends the dew point temperature values (°K)	9.002 DPT_Value_Tempd
167	Dew point temperature	Value in °F	Sends the dew point temperature values (°F)	9.027 DPT_Value_Temp_F
168	Maximum temperature measured	Value in °C	Sends maximum temperature measured values in Celsius degrees calculated by device	9.001 DPT_Temp
168	Maximum temperature measured	Value in °K	Sends maximum temperature measured values in Kelvin degrees calculated by device	9.002 DPT_Tempd
168	Maximum temperature measured	Value in °F	Sends maximum temperature measured values in Fahrenheit degrees calculated by device	9.027 DPT_Temp_F
169	Minimum temperature measured	Value in °C	Sends minimum temperature measured values in Celsius degrees calculated by device	9.001 DPT_Temp
169	Minimum temperature measured	Value in °K	Sends minimum temperature measured values in Kelvin degrees calculated by device	9.002 DPT_Tempd
169	Minimum temperature measured	Value in °F	Sends minimum temperature measured values in Fahrenheit degrees calculated by device	9.027 DPT_Temp_F
171	Maximum relative humidity measured	Value [% RH]	Sends the maximum relative humidity values measured by the device	9.007 DPT_Value_Humidity
172	Minimum relative humidity measured	Value [% RH]	Sends the minimum relative humidity values measured by the device	9.007 DPT_Value_Humidity
174	Specific humidity	Value [g/kg]	Sends specific humidity values in g/kg	14.005 DPT_Value_Amplitude
176	Thermal comfort status feedback	1=Comfortable/0=Uncomfortable	Sends the thermal comfort status feedback	1.002 DPT_Bool

Input objects:

#	Object Name			Object function	Description	Datapoint type	
2	4	6	8	Temperature threshold x value regulation	1 = Increase/0 = Decrease	Receives increase/decrease step commands of the temperature threshold 1 value	1.007 DPT_Step
2	4	6	8	Temperature threshold x value input	Value °C	Receives the temperature threshold 1 values in Celsius degrees	9.001 DPT_Temp
2	4	6	8	Temperature threshold x value input x	Value °K	Sends temperature values in degrees Kelvin calculated by device	9.002 DPT_Tempd
2	4	6	8	Temperature threshold x value input	Value °F	Sends temperature values in degrees Fahrenheit calculated by device	9.027 DPT_Temp_F
10	12	14	16	Relative humidity threshold x value regulation	1 = Increase/0 = Decrease	Receives increase/decrease step commands of the relative humidity threshold x value	1.007 DPT_Step

10	12	14	16	Relative humidity threshold x value input	Value % RH	Receives the relative humidity threshold x value	9.007 DPT_Value_Humidity
18	22	26	30	Output A temperature threshold x reference	HVAC Mode (com/precom/eco/off)	Receives the reference HVAC mode values (comfort/precomfort/economy/off) for the calculation of the output A associated with the temperature threshold x	20.102 DPT_HVAC_Mode
18	22	26	30	Output A temperature threshold x reference	Setpoint in °C	Receives the reference setpoint values (°C) for the calculation of the output A associated with the temperature threshold x	9.001 DPT_Temp
18	22	26	30	Output A temperature threshold x reference	Setpoint in °K	Receives the reference setpoint values (°K) for the calculation of the output A associated with the temperature threshold x	9.002 DPT_Tempd
18	22	26	30	Output A temperature threshold x reference	Setpoint in °F	Sends the setpoint values (°F) associated with the output A of temperature threshold x	9.027 DPT_Temp_F
18	22	26	30	Temperature threshold x output A status	On/Off status	Receives feedback about the state of activation of the output A associated with the temperature threshold x	1.001 DPT_Switch
34	38	42	46	Temperature threshold x output A status	HVAC Mode (com/precom/eco/off)	Receives the reference HVAC mode values (comfort/precomfort/economy/off) for the calculation of the output A associated with the temperature threshold x	20.102 DPT_HVAC_Mode
34	38	42	46	Temperature threshold x output A status	Setpoint in °C	Receives the reference setpoint values (°C) for the calculation of the output A associated with the temperature threshold x	9.001 DPT_Temp
34	38	42	46	Temperature threshold x output A status	Setpoint in °K	Receives the reference setpoint values (°K) for the calculation of the output A associated with the relative humidity threshold x	9.002 DPT_Tempd
34	38	42	46	Temperature threshold x output A status	Setpoint in °F	Receives the reference setpoint values (°F) for the calculation of the output A associated with the relative humidity threshold x	9.027 DPT_Temp_F
34	38	42	46	Relative humidity threshold x output A status	On/Off status	Receives feedback about the state of activation of the output A associated with the relative humidity threshold x	1.001 DPT_Switch
50	62	74	86	Output B temperature threshold x reference	HVAC (com/precom/eco/off)	Receives the reference HVAC mode values (comfort/precomfort/economy/off) for the calculation of the output B associated with the temperature threshold x	20.102 DPT_HVAC_Mode
50	62	74	86	Output B temperature threshold x reference	Setpoint in °C	Receives the reference setpoint values (°C) for the calculation of the output B associated with the temperature threshold x	9.001 DPT_Temp
50	62	74	86	Output B temperature threshold x reference	Setpoint in °K	Receives the reference setpoint values (°K) for the calculation of the output B associated with the temperature threshold x	9.002 DPT_Tempd
50	62	74	86	Output B temperature threshold x reference	Setpoint in °F	Receives the reference setpoint values (°F) for the calculation of the output B associated with the temperature threshold x	9.027 DPT_Temp_F
50	62	74	86	Temperature threshold x output B status	On/Off status	Receives feedback about the state of activation of the output B associated with the temperature threshold x	1.001 DPT_Switch
54	66	78	90	Output C temperature threshold x reference	HVAC Mode (com/precom/eco/off)	Receives the reference HVAC mode values (comfort/precomfort/economy/off) for the calculation of the output C associated with the temperature threshold x	20.102 DPT_HVAC_Mode

54	66	78	90	Output C temperature threshold x reference	Setpoint in °C	Receives the reference setpoint values (°C) for the calculation of the output C associated with the temperature threshold x	9.001 DPT_Temp
54	66	78	90	Output C temperature threshold x reference	Setpoint in °K	Receives the reference setpoint values (°K) for the calculation of the output C associated with the temperature threshold x	9.002 DPT_Tempd
54	66	78	90	Output C temperature threshold x reference	Setpoint in °F	Receives the reference setpoint values (°F) for the calculation of the output C associated with the temperature threshold x	9.027 DPT_Temp_F
54	66	78	90	Temperature threshold x output C status	On/Off status	Receives feedback about the state of activation of the output C associated with the temperature threshold x	1.001 DPT_Switch
58	70	82	94	Output D temperature threshold x reference	HVAC Mode (com/precom/eco/off)	Receives the reference HVAC mode values (comfort/precomfort/economy/off) for the calculation of the output D associated with the temperature threshold x	20.102 DPT_HVAC_Mode
58	70	82	94	Output D temperature threshold x reference	Setpoint in °C	Receives the reference setpoint values (°C) for the calculation of the output D associated with the temperature threshold x	9.001 DPT_Temp
58	70	82	94	Output D temperature threshold x reference	Setpoint in °K	Receives the reference setpoint values (°K) for the calculation of the output D associated with the temperature threshold x	9.002 DPT_Tempd
58	70	82	94	Output D temperature threshold x reference	Setpoint in °F	Receives the reference setpoint values (°F) for the calculation of the output D associated with the temperature threshold x	9.027 DPT_Temp_F
58	70	82	94	Temperature threshold 1 output D status	On/Off status	Receives feedback about the state of activation of the output D associated with the temperature threshold x	1.001 DPT_Switch
98	110	122	134	Output B relative humidity threshold x reference	HVAC Mode (com/precom/eco/off)	Receives the reference HVAC mode values (comfort/precomfort/economy/off) for the calculation of the output B associated with the relative humidity threshold x	20.102 DPT_HVAC_Mode
98	110	122	134	Output B relative humidity threshold x reference	Setpoint in °C	Receives the reference setpoint values (°C) for the calculation of the output B associated with the relative humidity threshold x	9.001 DPT_Temp
98	110	122	134	Output B relative humidity threshold x reference	Setpoint in °K	Receives the reference setpoint values (°K) for the calculation of the output B associated with the relative humidity threshold x	9.002 DPT_Tempd
98	110	122	134	Output B relative humidity threshold x reference	Setpoint in °F	Receives the reference setpoint values (°F) for the calculation of the output B associated with the relative humidity threshold x	9.027 DPT_Temp_F
98	110	122	134	Relative humidity threshold x output B status	On/Off status	Receives feedback about the state of activation of the output B associated with the relative humidity threshold x	1.001 DPT_Switch
102	114	126	138	Output C relative humidity threshold x reference	HVAC mode (com/precom/eco/off)	Receives the reference HVAC mode values (comfort/precomfort/economy/off) for the calculation of the output C associated with the relative humidity threshold x	20.102 DPT_HVAC_Mode
102	114	126	138	Output C relative humidity threshold x reference	Setpoint in °C	Receives the reference setpoint values (°C) for the calculation of the output C associated with the relative humidity threshold x	9.001 DPT_Temp
102	114	126	138	Output C relative humidity threshold x reference	Setpoint in °K	Receives the reference setpoint values (°K) for the calculation of	9.002 DPT_Tempd

						the output C associated with the relative humidity threshold x	
102	114	126	138	Output C relative humidity threshold x reference	Setpoint in °F	Receives the reference setpoint values (°F) for the calculation of the output C associated with the relative humidity threshold x	9.027 DPT_Temp_F
102	114	126	138	Relative humidity threshold x output C status	On/Off status	Receives feedback about the state of activation of the output C associated with the relative humidity threshold x	1.001 DPT_Switch
106	118	130	142	Output D relative humidity threshold x reference	HVAC mode (com/precom/eco/off)	Receives the reference HVAC mode values (comfort/precomfort/economy/off) for the calculation of the output D associated with the relative humidity threshold x	20.102 DPT_HVAC_Mode
106	118	130	142	Output D relative humidity threshold x reference	Setpoint in °C	Receives the reference setpoint values (°C) for the calculation of the output D associated with the relative humidity threshold x	9.001 DPT_Temp
106	118	130	142	Output D relative humidity threshold x reference	Setpoint in °K	Receives the reference setpoint values (°K) for the calculation of the output D associated with the relative humidity threshold x	9.002 DPT_Tempd
106	118	130	142	Output D relative humidity threshold x reference	Setpoint in °F	Receives the reference setpoint values (°F) for the calculation of the output D associated with the relative humidity threshold x	9.027 DPT_Temp_F
106	118	130	142	Relative humidity threshold x output D status	On/Off status	Receives feedback about the state of activation of the output D associated with the relative humidity threshold x	1.001 DPT_Switch
146	148	150	152	Temperature threshold X enabling	0=Enable/1=Disable	Receives temperature threshold x enabling commands	1.002 DPT_Bool
146	148	150	152	Temperature threshold 1 enabling	0=Enable/1=Disable	Receives temperature threshold x enabling commands	1.002 DPT_Bool
154	156	158	160	Relative humidity threshold x enabling	1=Enable/0=Disable	Receives relative humidity threshold x enabling commands	1.002 DPT_Bool
154	156	158	160	Relative humidity threshold x enabling	1=Enable/0=Disable	Receives relative humidity threshold x enabling commands	1.002 DPT_Bool
162	Dew point temperature alarm enabling				Enable/Disable	Receives dew point temperature alarm threshold enabling commands	1.002 DPT_Bool
164	Dew point temperature alarm limit regulation				1 = Increase/0 = Decrease	Receives increase/decrease step commands of the dew point temperature alarm limit	1.007 DPT_Step
170	Maximum and minimum temperature values reset				Values reset	Receives trigger commands of maximum and minimum temperature values reset	1.017 DPT_Trigger
173	Maximum and minimum relative humidity values reset				Values reset	Receives trigger commands of maximum and minimum relative humidity values reset	1.017 DPT_Trigger
175	Season selection input				1=Summer 0=Winter	Receives current season setting for thermal comfort	1.002 DPT_Bool
175	Season selection input				1=Summer 0=Winter	Receives current season setting for thermal comfort	1.002 DPT_Bool
177	Feedback sending trigger				Send feedbacks	Receive trigger commands of feedback sending request	1.017 DPT_Trigger

Ai sensi dell'articolo 9 comma 2 della Direttiva Europea 2004/108/CE si informa che responsabile dell'immissione del prodotto sul mercato Comunitario è:
According to article 9 paragraph 2 of the European Directive 2004/108/EC, the responsible for placing the apparatus on the Community market is:
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