



FlatSensato

**KNX Humidity and Temperature sensor
for flush mounting**

ZS-FSEN

Application Program Version: [1.0]

User Manual Version: [1.0]_a

www.zennio.com

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1 INTRODUCTION

1.1 FLAT SENSATO

Flat Sensato is a sensor with a flat design to measure ambient temperature, relative humidity and to calculate dew point for the sending of humidity, temperature and condensation.

The most outstanding features and functions of the device are:

- Measurement of **dry air temperature**.
- Measurement of **relative air humidity** indoor.
- Measurement of **dew point temperature**.
- **Alarms** of maximum and minimum temperature and relative humidity.
- **Condensation monitoring** on surfaces.
- Relative humidity **LED notification**.
- **2** analogue/digital configurable **inputs**.
- **10** customisable, multi-operation **logic functions**
- **Heartbeat** or periodical “still-alive” notification.

1.2 INSTALLATION

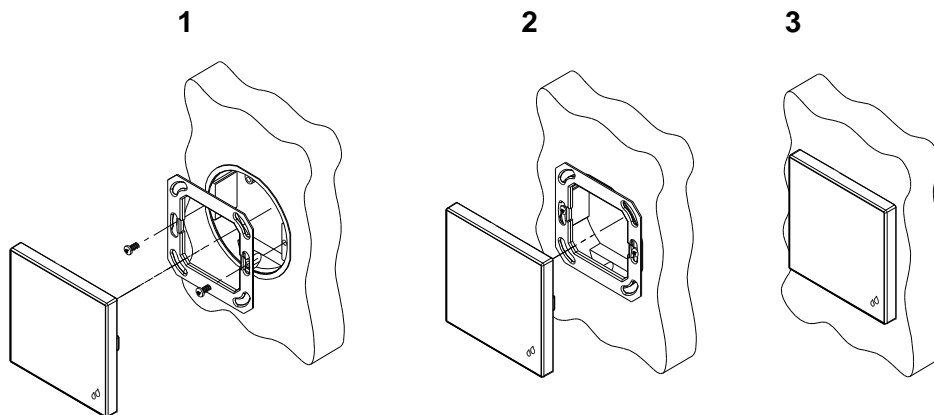


Figure 1. Installation

To install the device, it is first necessary to mount the metallic plate into a square/round standard appliance box through the suitable screws. Next, Flat Sensato is connected to the KNX bus through the corresponding terminal on the rear side of the device, and then the input terminal is as well connected to the rear of the device.

Once the input terminal and the KNX terminal are connected, the device can be easily mounted on the metallic plate by the action of the fixing clips.

Finally, it is advisable to check that the device is properly installed, and that only its profile becomes visible from above, from below and from both sides (the metallic plate should be completely hidden).

Figure 2 shows the connection outline of the device:

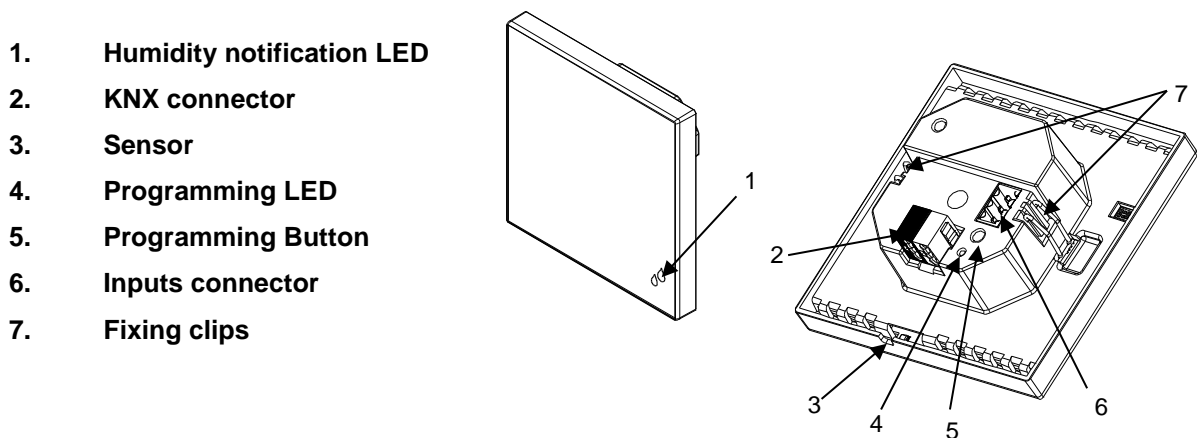


Figure 2. Schematic diagram

This device does not need any external supply, as it is powered through the KNX bus.

The programming button (5) can be pressed with the help of a thin screw to set the device into the **Programming Mode**. After a short press, the programming LED (4) will light in red. Note that if this button is held while plugging the device into the KNX bus, the device will enter the **Safe Mode**. The LED will then blink in red.

For detailed information about the technical features of the device, as well as on security and installation procedures, please refer to the device **Datasheet**, bundled within the original packaging of the device and also available at <http://www.zennio.com>.

2 CONFIGURATION

After importing the corresponding database in ETS and adding the device into the topology of the desired project, the configuration process begins by entering the Parameters tab of the device.

2.1 GENERAL

From the “General” tab enabling additional functions available for the device is possible.

ETS PARAMETERISATION

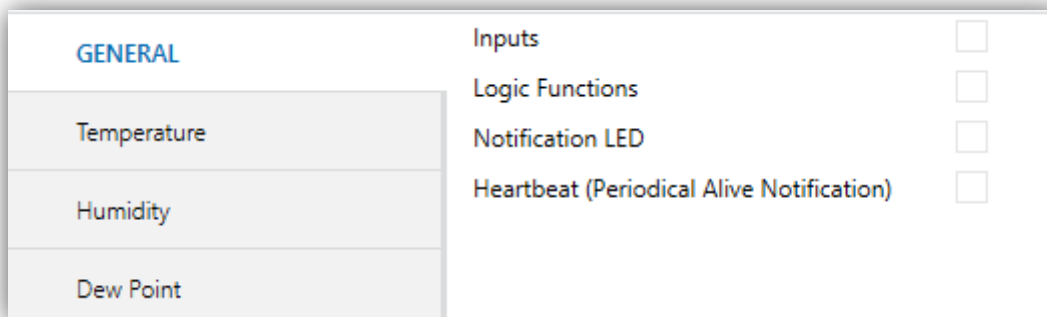
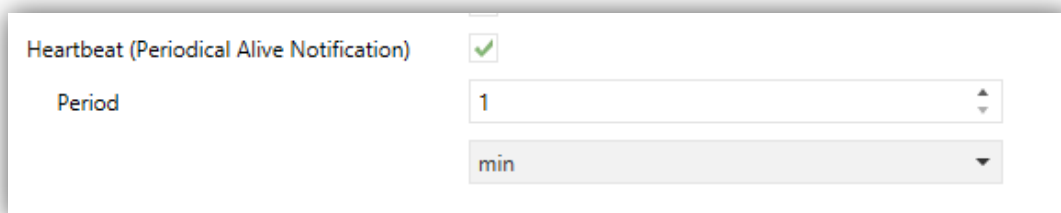


Figure 3 General settings

- **Inputs:** enables or disables the “Inputs” tab in the tree on the left, depending on whether the device will or will not be connected any external accessories. See section 2.6 for details.
- **Logic Functions:** enables or disables the “Logic Functions” tab in the tree on the left, depending on whether this functionality is required or not. See section 2.7 for details.
- **Notification LED:** enables or disables the “Notification LED” tab in the tree on the left, depending on whether this functionality is required or not. See section 2.5 for details.
- **Heartbeat (Periodical Alive Notification):** this parameter lets the integrator incorporate one-bit object to the project (“**[Heartbeat]Object to Send ‘1’**”)

that will be sent periodically with value “1” to notify that the device is still working (*still alive*).



Heartbeat (Periodical Alive Notification)	<input checked="" type="checkbox"/>
Period	1
	min

Figure 4. Heartbeat (Periodical Alive Notification)

Note: *The first sending after download or bus failure takes place with a delay of up to 255 seconds, to prevent bus overload. The following sendings match the period set.*

2.2 TEMPERATURE

Flat Sensato is capable of measure and monitor temperature measurements, as well as send **these values to the bus** and **report high / low temperature situations**. To that end, it is necessary to configure a set of parameters.

ETS PARAMETERISATION

The object “[Temp] Current Temperature” (2 bytes) will appear by default. This object will report the current value of the temperature periodically or after a certain increment/decrement, according to the parameter configuration.

GENERAL	Temperature sensor CALIBRATION	0	x 0.1 °C
Temperature	Temperature sending PERIOD (0 = Disabled)	0	x 10 s.
Humidity	Send with a Temperature Change (0 = Disabled)	10	x 0.1 °C
Dew Point	Temperature Protection	No	

Figure 5. Temperature - Configuration

- **Temperature Sensor Calibration:** defines an offset to be applied to the measurement received from the probe to correct deviations due to external factors. The offset should be in the range [-50, 50] tenths of a degree.
- **Temperature Sending Period:** sets every how much time the value of the current temperature should be sent to the bus (through “[Temp] Current Temperature”), in the range 0 – 255 tens of second. The value “0” leaves this periodical sending disabled.
- **Send with a Temperature Change:** defines a threshold (in the range 0 to 255 tenths of a degree) so that whenever a new reading of the current temperature is found to differ (from the last value sent to the bus) more than such threshold, an extra sending will take place. The value “0” leaves this sending with a temperature change disabled.

- **Temperature Protection:** drop-down list with the following options:
 - No: no temperature protection is required.
 - Overheating: overheating protection is required. Two extra parameters will come up:
 - **Overheating Temp.:** maximum temperature permitted, in the range -30 to 125 °C. Temperature readings greater than this will be considered overheat, and therefore a “1” will be periodically sent through object “[Temp] Overheat”. Once the overheat is over, a “0” will be sent (once).
 - **Hysteresis:** dead *band* or threshold (in the range 1 to 200 tenths of a degree; the default is 20 tenths of a degree –i.e., twenty degrees–) around the overheat temperature defined above. This dead band prevents the device from sending the overheat alarm and no-alarm over and over when the current temperature keeps fluctuating around the overheat limit (T): once the overheat alarm has been triggered, the no-alarm will not be sent until the current temperature is lower than that T minus the hysteresis. After that, if the current temperature reaches T again, the alarm will be re-sent.
 - Overcooling: overcooling protection is required. Two extra parameters (analogous to the above two) will come up:
 - **Overcooling Temp.:** minimum temperature permitted, in the range -30 to 125 °C. Temperature readings lower than this will be considered overcool, and therefore a “1” will be periodically sent through object “[Temp] Overcool”. After the overcool is over, a “0” will be sent (once).
 - **Hysteresis:** dead band or threshold (in the range 1 to 200 tenths of a degree; the default is 20 tenths of a degree) around the overcooling temperature. As for the overheat, once the alarm has been triggered, the no-alarm will not be sent until the current temperature is greater than T plus the hysteresis. After that, if the current temperature reaches T again, the alarm will be re-sent.
 - Overheating and Overcooling: both overheating and overcooling protection are required. The following three parameters will come up:

- **Overheating Temp.**
- **Overcooling Temp.**
- **Hysteresis.**

The three of them are analogous to those already explained separately.

2.3 HUMIDITY

Flat Sensato is capable of measure and monitor humidity measurements, as well as send **these values to the bus** and **report high / low humidity situations**. To that end, it is necessary to configure a set of parameters.

ETS PARAMETERISATION

The object “[Hum] Current Humidity” (2 bytes), visible by default, will report the current value of the humidity periodically or after a certain increment/decrement, according to the parameter configuration.

GENERAL	Humidity sensor CALIBRATION	0	%
Temperature	Humidity sending PERIOD (0 = Disabled)	0	x 10 s.
Humidity	Send with a Humidity Change (0 = Disabled)	5	%
Dew Point	Humidity Protection	No No ✓ High Humidity Low Humidity Low and High Humidity	

Figure 6. Humidity - Configuration

- **Humidity Sensor Calibration:** defines an offset to be applied to the measurement received from the probe to correct deviations due to external factors. The offset should be in the range [-12, 12] tenths of a degree.
- **Humidity Sending Period:** sets every how much time the value of the current humidity should be sent to the bus (through “[Hum] Current Humidity”), in the range 0 – 255 tens of second. The value “0” leaves this periodical sending disabled.
- **Send with a Humidity Change:** defines a threshold (in the range 0 to 25 %) so that whenever a new reading of the current humidity is found to differ (from the last value sent to the bus) more than such threshold, an extra sending will take place. The value “0” leaves this sending with a humidity change disabled.

- **Humidity Protection:** drop-down list with the following options:
 - No: no alarm is enabled.
 - Overheating: high humidity alarm is enabled. Two extra parameters will come up:
 - **High Humidity:** Parameter to set the maximum humidity value from which the alarm will be activated. This parameter is an integer value between 0 and 100, referenced to % units. The default value of the high humidity will be 65%. Humidity readings greater than this will cause that “1” will be sent periodically through object “[Hum] High Humidity”. Once the humidity is below, a “0” will be sent (once).
 - **Hysteresis:** *dead band* or threshold (in the range 1 to 25%; the default value is 5%) around the high humidity defined above. This dead band prevents the device from sending the alarm and no-alarm over and over when the current humidity keeps fluctuating around the limit (H): once the alarm has been triggered, the no-alarm will not be sent until the current humidity is lower than that H minus the hysteresis. After that, if the current humidity reaches H again, the alarm will be re-sent.
 - Low Humidity: low humidity alarm is enabled. Two extra parameters (analogous to the above two) will come up:
 - **Low Humidity:** Parameter to set the minimum humidity value from which the alarm will be activated. This parameter is an integer value between 0 and 100, referenced to % units. The default value of the low humidity will be 25%. Humidity readings lower than this will cause that “1” will be sent periodically through object “[Hum] Low Humidity”. Once the humidity is over, a “0” will be sent (once).
 - **Hysteresis:** dead band or threshold (in the range 1 to 25%; the default value is 5%) around the low humidity. This dead band prevents the device from sending the alarm and no-alarm over and over when the current humidity keeps fluctuating around the limit (H): once the alarm has been triggered, the no-alarm will not be sent until the current

humidity is greater than that H plus the hysteresis. After that, if the current humidity reaches H again, the alarm will be re-sent.

➤ Low Humidity and High Humidity: high humidity and low humidity alarms are enabled. The following three parameters will come up:

- **High Humidity.**
- **Low Humidity.**
- **Hysteresis.**

The three of them are analogous to those already explained separately.

2.4 DEW POINT

The dew point is the value at which the temperature of the air must decrease so that the existing water vapour begins to condense.

The device is able to calculate the dew point and determine whether condensation on the surface will occur, taking into account the measurements of temperature and humidity. Please, refer to [ANNEX I. Dew Point Theory](#) for further information.

ETS PARAMETERISATION

GENERAL	Dew Point sending PERIOD (0 = Disabled)	0	x 10 s.
Temperature	Send with a Dew Point Change (0 = Disabled)	10	x 0.1 °C
Humidity	Condensation Protection	<input checked="" type="checkbox"/>	
Dew Point	Dew Point Offset	15	x 0.1 °C
	Hysteresis	20	x 0.1 °C

Figure 7 Dew Point - Configuration

- **Dew Point sending period:** sets every how much time the value of the current dew point temperature should be sent to the bus (through “[Dew] Dew Point Temperature”), in the range 0 – 255 tens of second. The value “0” leaves this periodical sending disabled.
- **Send with a Dew Point Change:** defines a threshold (in the range 0 to 255 tenths of a degree) so that whenever a new reading of the current dew point is found to differ (from the last value sent to the bus) more than such threshold, an extra sending will take place. The value “0” leaves this sending with a dew point change disabled.
- **Condensation Protection:** checkbox (disabled by default) to enable/disable the condensation alarm.
- **Dew Point Offset:** value that will be added to the theoretical dew point temperature calculated by the system, whose result will be used as trigger

for the condensation alarm notification. Possible values from 0 to 255 (15 by default) tenths of a degree.

- **Hysteresis:** dead band or threshold (in the range 1 to 200 tenths of a degree; the default is 20 tenths of a degree) around the dew point. This dead band prevents the device from sending the condensation alarm and no-alarm over and over when it keeps fluctuating around the limit: once the alarm has been triggered, the no-alarm will not be sent until the current temperature is greater than that the dew point temperature plus the offset. After that, if the current temperature reaches the limit again, the alarm will be re-sent.

2.5 NOTIFICATION LED

2.5.1 CONFIGURATION

Flat Sensato has a LED to notify, through colours, the ranges of the current humidity values. The colour to notify the humidity ranges can be two (green and yellow) or three (green, yellow and red).

It is possible to modify by parameter the humidity thresholds of the range corresponding to each color. The following figure shows an example with the default threshold values:

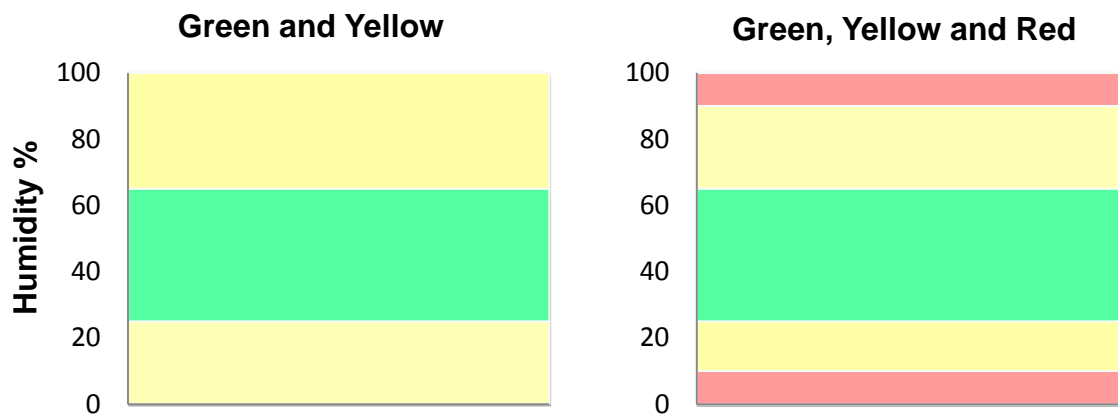


Figure 8. Default colors of Notification LED.

ETS PARAMETERISATION

After enabling “**Notification LED**” (see section 2.1), a new tab will be incorporated into the tree on the left.

The parameters available in this tab are:

- **Colours Shown:** allows selecting whether the notification LED comprises two or three colours: “Green and Yellow” or “Green, Yellow and Red” (by default).
- **Red / Yellow / Green:** humidity value (0-100%) from which the notification LED will display the indicated colour. The limit values (0% and 100%) are not editable. Default values are shown in the following figures.


The screenshot shows a configuration interface for humidity LED notification colors. On the left is a sidebar with menu items: GENERAL, Temperature, Humidity, Dew Point, Notification LED, and Configuration. The main area is titled 'HUMIDITY LED NOTIFICATION COLOURS'. Under 'Colours Shown', the radio button for 'Green, Yellow and Red' is selected. Below this are five vertical sliders with percentage indicators: Red (100%), Red (90%), Yellow (65%), Green (25%), and Yellow (10%), followed by a Red slider at 0%.

Figure 9. Notification LED – Green, Yellow and Red

This screenshot is similar to Figure 9 but shows the 'Green and Yellow' radio button selected under 'Colours Shown'. The slider values are: Red (100%), Yellow (65%), Green (25%), Yellow (0%), and Red (0%).

Figure 10. Notification LED – Green and Yellow

The threshold values should be set from highest to lowest (from top to bottom). If this indication is not met, default values will be taken. In addition, an alert message will be shown.

 *Incorrect yellow threshold values. The default values will be downloaded in case of an incorrect parameterisation.*

2.6 INPUTS

Flat Sensato incorporates **two analogue/digital inputs**, each configurable as a:

- **Binary Input**, for the connection of a pushbutton or a switch/sensor.
- **Temperature Probe**, for the connection of a temperature sensor from Zennio.
- **Motion Detector**, for the connection of a motion detector (models ZN1IO-DETEC-P and ZN1IO-DETEC-X from Zennio).

Important: *older models of the Zennio motion detector (e.g., ZN1IO-DETEC and ZN1IO-DETEC-N) will not work properly with Flat Sensato.*

ETS PARAMETERISATION

When **Inputs** has been activated in the General parameters screen, the following drop-down lists will be available for the selection of the specific functions required.

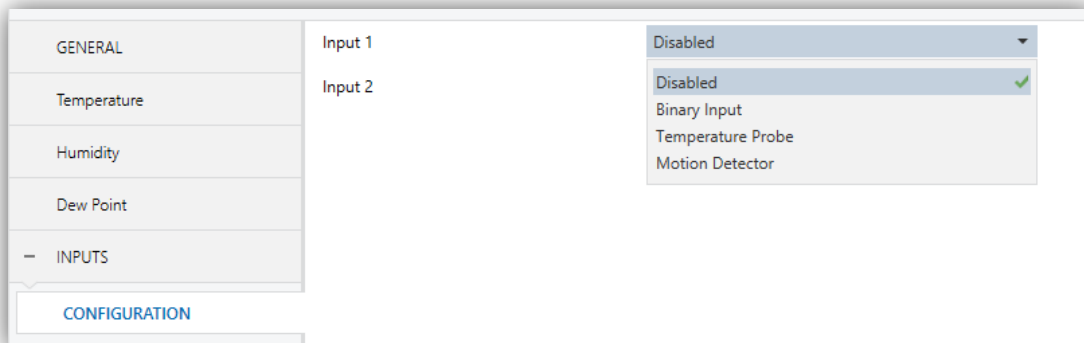


Figure 11. Inputs. Configuration.

All inputs are disabled by default. Depending on the function selected for each input, additional tabs will be included in the menu on the left.

2.6.1 BINARY INPUTS

Please refer to the “**Binary Inputs**” user manual, available in the Flat Sensato product section, at the Zennio website (www.zennio.com).

2.6.2 TEMPERATURE PROBE

Please refer to the “**Temperature Probe**” user manual, available in the Flat Sensato product section, at the Zennio website (www.zennio.com).

2.6.3 MOTION DETECTOR

It is possible to connect motion detectors (models **ZN1IO-DETEC-P** and **ZN1IO-DETEC-X** from Zennio) to the input ports of Flat Sensato.

Please refer to the “**Motion Detector**” user manual, available in the Flat Sensato product section, at the Zennio website (www.zennio.com).

Notes:

- *The ZN1IO-DETEC-P motion detector is compatible with a variety of Zennio devices. However, depending on the device it is actually being connected to, the functionality may differ slightly. Therefore, please refer specifically to the corresponding product section to obtain the aforementioned document.*
- *Motion detectors with references ZN1IO-DETEC and ZN1IO-DETEC-N are **not compatible** with Flat Sensato (may report inaccurate measurements if connected to this device).*
- *When connected to Flat Sensato, the rear micro-switch of model ZN1IO-DETEC-P should be set to position “**Type B**”.*

2.7 LOGIC FUNCTIONS

This module makes it possible to perform numeric and binary operations with incoming values received from the KNX bus, and to send the results through other communication objects specifically enabled for this purpose.

Flat Sensato can implement **up to 10 different and independent functions**, each of them entirely customisable and consisting in **up to 4 consecutive operations each**.

The execution of each function can depend on a configurable **condition**, which will be evaluated every time the function is **triggered** through specific, parameterisable communication objects. The result after executing the operations of the function can also be evaluated according to certain **conditions** and afterwards sent (or not) to the KNX bus, which can be done every time the function is executed, periodically or only when the result differs from the last one.

Please refer to the “**Logic Functions**” user manual (available in the Flat Sensato product section at the Zennio homepage, www.zennio.com) for detailed information about the functionality and the configuration of the related parameters.

ANNEX I. DEW POINT THEORY

Dew point or **dew point temperature** is defined as the temperature at which the air mass is notable to hold more water and, thus, the water begins to condense.

Therefore, dew point temperature only depends on the amount of water in the air (absolute humidity) as well as the pressure in the mass of air. So that, only modifying the air temperature, the dew point temperature does not vary.

The **relative humidity** is, approximately, the ratio of the amount of humidity in the air to the total amount of humidity the air can hold (saturation). On the other hand, as air temperature increases, the capacity to hold water increases as well. This means that, keeping the absolute humidity constant, the relative humidity varies with the air temperature, according to:

Temperature ↑, relative humidity ↓

Temperature ↓, relative humidity ↑

For this reason, it can be understood that relative humidity relates the current temperature of the air to the absolute humidity of the air, and hence the dew point temperature. In such a way, an approximation of the dew point temperature could be known by lowering the air temperature until a relative humidity of 100% was obtained, which is known as the saturation point.

An approximation of the ratio between the dew point temperature and the temperature of the air can be represented according to the following formula:

$$T_{DP} = T_{air} + 35 \log(RH/100)$$

ANNEX II. COMMUNICATION OBJECTS

- “Functional range” shows the values that, with independence of any other values permitted by the bus according to the object size, may be of any use or have a particular meaning because of the specifications or restrictions from both the KNX standard or the application program itself.

Number	Size	I/O	Flags	Data type (DPT)	Functional Range	Name	Function
1	1 Bit		CT---	DPT_Trigger	0/1	[Heartbeat] Object to Send '1'	Sending of '1' Periodically
2	2 Bytes	O	CTR--	DPT_Value_Temp	-273.00 - 670760.00	[Temp] Current Temperature	Temperature Sensor Value
3	1 Bit	O	CTR--	DPT_Alarm	0/1	[Temp] Overcooling	0 = No Alarm; 1 = Alarm
4	1 Bit	O	CTR--	DPT_Alarm	0/1	[Temp] Overheating	0 = No Alarm; 1 = Alarm
6	2 Bytes	O	CTR--	DPT_Value_Humidity	-671088.64 - 670760.96	[Hum] Current Humidity	Humidity Sensor Value
7	1 Bit	O	CTR--	DPT_Alarm	0/1	[Hum] Low Humidity	0 = No Alarm; 1 = Alarm
8	1 Bit	O	CTR--	DPT_Alarm	0/1	[Hum] High Humidity	0 = No Alarm; 1 = Alarm
10	2 Bytes	I	C--W-	DPT_Value_Temp	-273.00 - 670760.00	[Dew] Surface Temperature	Input Surface Temperature Value
11	2 Bytes	O	CTR--	DPT_Value_Temp	-273.00 - 670760.00	[Dew] Dew Point Temperature	Dew Point Temperature Value
13	1 Bit	O	CTR--	DPT_Alarm	0/1	[Dew] Condensation	0 = No Alarm; 1 = Alarm
14, 20	1 Bit	I	C--W-	DPT_Enable	0/1	[Ix] Input Lock	0 = Unlock; 1 = Lock
15, 21	1 Bit		CT---	DPT_Switch	0/1	[Ix] [Short Press] 0	Sending of 0
	1 Bit		CT---	DPT_Switch	0/1	[Ix] [Short Press] 1	Sending of 1
	1 Bit	I	CT-W-	DPT_Switch	0/1	[Ix] [Short Press] 0/1 Switching	Switching 0/1
	1 Bit		CT---	DPT_UpDown	0/1	[Ix] [Short Press] Move Up Shutter	Sending of 0 (Up)
	1 Bit		CT---	DPT_UpDown	0/1	[Ix] [Short Press] Move Down Shutter	Sending of 1 (Down)
	1 Bit		CT---	DPT_UpDown	0/1	[Ix] [Short Press] Move Up/Down Shutter	Switching 0/1 (Up/Down)
	1 Bit		CT---	DPT_Step	0/1	[Ix] [Short Press] Stop/Step Up Shutter	Sending of 0 (Stop/Step Up)
	1 Bit		CT---	DPT_Step	0/1	[Ix] [Short Press] Stop/Step Down Shutter	Sending of 1 (Stop/Step Down)
	1 Bit		CT---	DPT_Step	0/1	[Ix] [Short Press] Stop/Step Shutter (Switched)	Switching of 0/1 (Stop/Step Up/Down)
	4 Bit		CT---	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) 0x2 (Dec. by 50%) 0x3 (Dec. by 25%) 0x4 (Dec. by 12%)	[Ix] [Short Press] Brighter	Increase Brightness

				0x5 (Dec. by 6%) 0x6 (Dec. by 3%) 0x7 (Dec. by 1%) 0x8 (Stop) 0x9 (Inc. by 100%) 0xA (Inc. by 50%) 0xB (Inc. by 25%) 0xC (Inc. by 12%) 0xD (Inc. by 6%) 0xE (Inc. by 3%) 0xF (Inc. by 1%)		
	4 Bit		CT--- DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0x9 (Inc. by 100%) ... 0xF (Inc. by 1%)	[Ix] [Short Press] Darker	Decrease Brightness
	4 Bit		CT--- DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0x9 (Inc. by 100%) ... 0xF (Inc. by 1%)	[Ix] [Short Press] Brighter/Darker	Switch Bright/Dark
	1 Bit		CT--- DPT_Switch	0/1	[Ix] [Short Press] Light On	Sending of 1 (On)
	1 Bit		CT--- DPT_Switch	0/1	[Ix] [Short Press] Light Off	Sending of 0 (Off)
	1 Bit	I	CT-W- DPT_Switch	0/1	[Ix] [Short Press] Light On/Off	Switching 0/1
	1 Byte		CT--- DPT_SceneControl	0-63; 128-191	[Ix] [Short Press] Run Scene	Sending of 0 - 63
	1 Byte		CT--- DPT_SceneControl	0-63; 128-191	[Ix] [Short Press] Save Scene	Sending of 128 - 191
	1 Bit	I/O	CTRW _	DPT_Switch	0/1	[Ix] [Switch/Sensor] Edge Sending of 0 or 1
	1 Byte		CT--- DPT_Value_1_Ucount	0 - 255	[Ix] [Short Press] Constant Value (Integer)	0 - 255
	1 Byte		CT--- DPT_Scaling	0% - 100%	[Ix] [Short Press] Constant Value (Percentage)	0% - 100%
	2 Bytes		CT--- DPT_Value_2_Ucount	0 - 65535	[Ix] [Short Press] Constant Value (Integer)	0 - 65535
	2 Bytes		CT--- 9.xxx	-671088.64 - 670760.96	[Ix] [Short Press] Constant Value (Float)	Float Value
16, 22	1 Byte	I	C--W- DPT_Scaling	0% - 100%	[Ix] [Short Press] Shutter Status (Input)	0% = Top; 100% = Bottom

	1 Byte	I	C--W-	DPT_Scaling	0% - 100%	[Ix] [Short Press] Dimming Status (Input)	0% - 100%
17, 23	1 Bit		CT---	DPT_Switch	0/1	[Ix] [Long Press] 0	Sending of 0
	1 Bit		CT---	DPT_Switch	0/1	[Ix] [Long Press] 1	Sending of 1
	1 Bit	I	CT-W-	DPT_Switch	0/1	[Ix] [Long Press] 0/1 Switching	Switching 0/1
	1 Bit		CT---	DPT_UpDown	0/1	[Ix] [Long Press] Move Up Shutter	Sending of 0 (Up)
	1 Bit		CT---	DPT_UpDown	0/1	[Ix] [Long Press] Move Down Shutter	Sending of 1 (Down)
	1 Bit		CT---	DPT_UpDown	0/1	[Ix] [Long Press] Move Up/Down Shutter	Switching 0/1 (Up/Down)
	1 Bit		CT---	DPT_Step	0/1	[Ix] [Long Press] Stop/Step Up Shutter	Sending of 0 (Stop/Step Up)
	1 Bit		CT---	DPT_Step	0/1	[Ix] [Long Press] Stop/Step Down Shutter	Sending of 1 (Stop/Step Down)
	1 Bit		CT---	DPT_Step	0/1	[Ix] [Long Press] Stop/Step Shutter (Switched)	Switching of 0/1 (Stop/Step Up/Down)
	4 Bit		CT---	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0x9 (Inc. by 100%) ... 0xF (Inc. by 1%)	[Ix] [Long Press] Brighter	Long Pr. -> Brighter; Release -> Stop
	4 Bit		CT---	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0x9 (Inc. by 100%) ... 0xF (Inc. by 1%)	[Ix] [Long Press] Darker	Long Pr. -> Darker; Release -> Stop
	4 Bit		CT---	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0x9 (Inc. by 100%) ... 0xF (Inc. by 1%)	[Ix] [Long Press] Brighter/Darker	Long Pr. -> Brighter/Darker; Release -> Stop
	1 Bit		CT---	DPT_Switch	0/1	[Ix] [Long Press] Light On	Sending of 1 (On)
	1 Bit		CT---	DPT_Switch	0/1	[Ix] [Long Press] Light Off	Sending of 0 (Off)
	1 Bit	I	CT-W-	DPT_Switch	0/1	[Ix] [Long Press] Light On/Off	Switching 0/1

	1 Byte		CT---	DPT_SceneControl	0-63; 128-191	[Ix] [Long Press] Run Scene	Sending of 0 - 63
	1 Byte		CT---	DPT_SceneControl	0-63; 128-191	[Ix] [Long Press] Save Scene	Sending of 128 - 191
	1 Bit	O	CTR--	DPT_Alarm	0/1	[Ix] [Switch/Sensor] Alarm: Breakdown or Sabotage	1 = Alarm; 0 = No Alarm
	2 Bytes		CT---	9.xxx	-671088.64 - 670760.96	[Ix] [Long Press] Constant Value (Float)	Float Value
	2 Bytes		CT---	DPT_Value_2_Ucount	0 - 65535	[Ix] [Long Press] Constant Value (Integer)	0 - 65535
	1 Byte		CT---	DPT_Scaling	0% - 100%	[Ix] [Long Press] Constant Value (Percentage)	0% - 100%
	1 Byte		CT---	DPT_Value_1_Ucount	0 - 255	[Ix] [Long Press] Constant Value (Integer)	0 - 255
18, 24	1 Bit		CT---	DPT_Trigger	0/1	[Ix] [Long Press/Release] Stop Shutter	Release -> Stop Shutter
19, 25	1 Byte	I	C--W-	DPT_Scaling	0% - 100%	[Ix] [Long Press] Dimming Status (Input)	0% - 100%
	1 Byte	I	C--W-	DPT_Scaling	0% - 100%	[Ix] [Long Press] Shutter Status (Input)	0% = Top; 100% = Bottom
26, 30	2 Bytes	O	CTR--	DPT_Value_Temp	-273.00 - 670760.00	[Ix] Current Temperature	Temperature Sensor Value
27, 31	1 Bit	O	CTR--	DPT_Alarm	0/1	[Ix] Overcooling	0 = No Alarm; 1 = Alarm
28, 32	1 Bit	O	CTR--	DPT_Alarm	0/1	[Ix] Overheating	0 = No Alarm; 1 = Alarm
29, 33	1 Bit	O	CTR--	DPT_Alarm	0/1	[Ix] Probe Error	0 = No Alarm; 1 = Alarm
34	1 Byte	I	C--W-	DPT_SceneControl	0-63; 128-191	[Motion Detector] Scene Input	Scene Value
35	1 Byte	O	CTR--	DPT_SceneControl	0-63; 128-191	[Motion Detector] Scene Output	Scene Value
36, 65	1 Byte	O	CTR--	DPT_Scaling	0% - 100%	[Ix] Luminosity	0-100%
37, 66	1 Bit	O	CTR--	DPT_Alarm	0/1	[Ix] Open Circuit Error	0 = No Error; 1 = Open Circuit Error
38, 67	1 Bit	O	CTR--	DPT_Alarm	0/1	[Ix] Short Circuit Error	0 = No Error; 1 = Short Circuit Error
39, 68	1 Byte	O	CTR--	DPT_Scaling	0% - 100%	[Ix] Presence State (Scaling)	0-100%
40, 69	1 Byte	O	CTR--	DPT_HVACMode	1=Comfort 2=Standby 3=Economy 4=Building Protection	[Ix] Presence State (HVAC)	Auto, Comfort, Standby, Economy, Building Protection
41, 70	1 Bit	O	CTR--	DPT_Occupancy	0/1	[Ix] Presence State (Binary)	Binary Value
	1 Bit	O	CTR--	DPT_Ack	0/1	[Ix] Presence: Slave Output	1 = Motion Detected
42, 71	1 Bit	I	C--W-	DPT_Window_Door	0/1	[Ix] Presence Trigger	Binary Value to Trigger the Presence Detection
43, 72	1 Bit	I	C--W-	DPT_Ack	0/1	[Ix] Presence: Slave Input	0 = Nothing; 1 = Detection from slave device
44, 73	2 Bytes	I	C--W-	DPT_TimePeriodSec	0-65535	[Ix] Presence: Waiting Time	0-65535 s.

45, 74	2 Bytes	I	C--W-	DPT_TimePeriodSec	1-65535	[Ix] Presence: Listening Time	1-65535 s.
46, 75	1 Bit	I	C--W-	DPT_Enable	0/1	[Ix] Presence: Enable	According to parameters
47, 76	1 Bit	I	C--W-	DPT_Switch	0/1	[Ix] Presence: Day/Night	According to parameters
48, 77	1 Bit	O	CTR--	DPT_Occupancy	0/1	[Ix] Presence: Occupancy State	0 = Not Occupied; 1 = Occupied
49, 78	1 Bit	I	C--W-	DPT_Ack	0/1	[Ix] External Motion Detection	0 = Nothing; 1 = Motion detected by an external sensor
50, 55, 60, 79, 84, 89	1 Byte	O	CTR--	DPT_Scaling	0% - 100%	[Ix] [Cx] Detection State (Scaling)	0-100%
51, 56, 61, 80, 85, 90	1 Byte	O	CTR--	DPT_HVACMode	1=Comfort 2=Standby 3=Economy 4=Building Protection	[Ix] [Cx] Detection State (HVAC)	Auto, Comfort, Standby, Economy, Building Protection
52, 57, 62, 81, 86, 91	1 Bit	O	CTR--	DPT_Switch	0/1	[Ix] [Cx] Detection State (Binary)	Binary Value
53, 58, 63, 82, 87, 92	1 Bit	I	C--W-	DPT_Enable	0/1	[Ix] [Cx] Enable Channel	According to parameters
54, 59, 64, 83, 88, 93	1 Bit	I	C--W-	DPT_Switch	0/1	[Ix] [Cx] Force State	0 = No Detection; 1 = Detection
94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125	1 Bit	I	C--W-	DPT_Boo1	0/1	[LF] (1 bit) Data Entry x	Binary Data Entry (0/1)
126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141	1 Byte	I	C--W-	DPT_Value_1_Ucount	0 - 255	[LF] (1 byte) Data Entry x	1 byte Data Entry (0-255)
142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157	2 Bytes	I	C--W-	DPT_Value_2_Ucount	0 - 65535	[LF] (2 bytes) Data Entry x	2 bytes Data Entry
				DPT_Value_2_Count	-32768 - 32767		
				DPT_Value_Temp	-273,00 - 670760,00		
158, 159, 160, 161, 162, 163, 164, 165	4 Bytes	I	C--W-	DPT_Value_4_Count	-2147483648 - 2147483647	[LF] (4 bytes) Data Entry x	4 bytes Data Entry
166, 167, 168, 169, 170, 171, 172, 173, 174, 175	1 Bit	O	CTR--	DPT_Boo1	0/1	[LF] Function x - Result	(1 bit) Boolean
	1 Byte	O	CTR--	DPT_Value_1_Ucount	0 - 255	[LF] Function x - Result	(1 byte) Unsigned
	2 Bytes	O	CTR--	DPT_Value_2_Ucount	0 - 65535	[LF] Function x - Result	(2 bytes) Unsigned
	4 Bytes	O	CTR--	DPT_Value_4_Count	-2147483648 - 2147483647	[LF] Function x - Result	(4 bytes) Signed
	1 Byte	O	CTR--	DPT_Scaling	0% - 100%	[LF] Function x - Result	(1 byte) Percentage
	2 Bytes	O	CTR--	DPT_Value_2_Count	-32768 - 32767	[LF] Function x - Result	(2 bytes) Signed
	2 Bytes	O	CTR--	DPT_Value_Temp	-273.00 - 670760.00	[LF] Function x - Result	(2 bytes) Float



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Zennio Avance y Tecnología S.L.
C/ Río Jarama, 132. Nave P-8.11
45007 Toledo (Spain).

Tel. +34 925 232 002.

www.zennio.com
info@zennio.com

