



## CAPACITIVE TOUCH THERMOSTAT

**TM KNT 001**

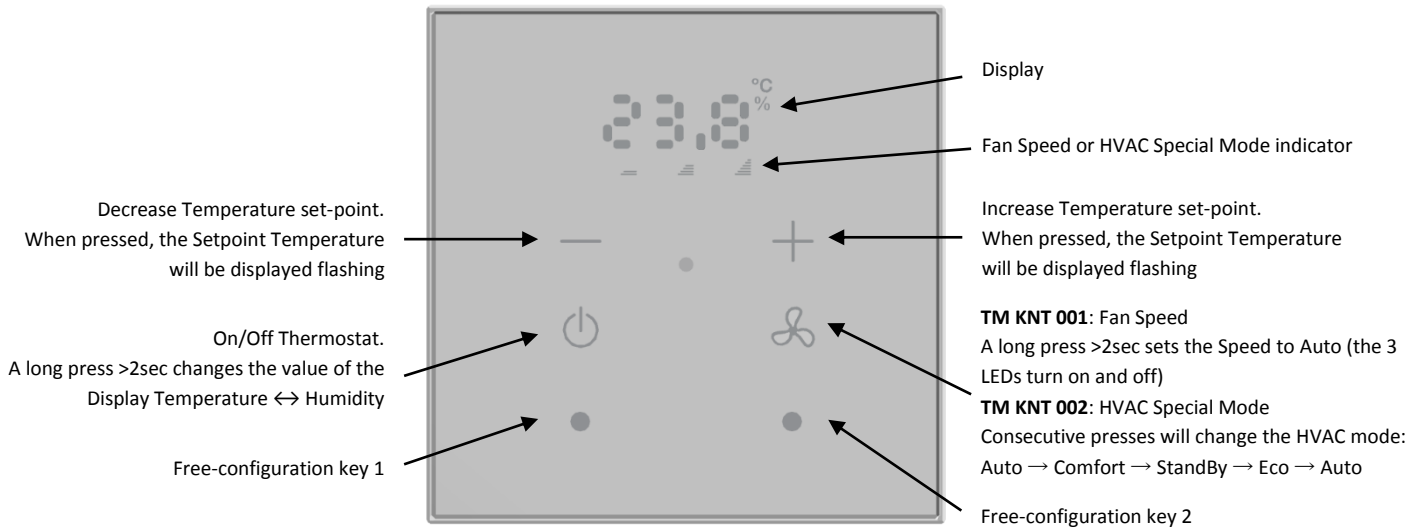
**TM KNT 002**



## USER MANUAL

## INTRODUCTION

- The new DINUY Touch Temperature Controllers are built on a functional evolution of the Laiüka Capacitive Switches.
- Two different references are available:
  - TM KNT 001: with button for setting the Fan-Coil Speed.
  - TM KNT 002: with button for setting the HVAC Special Mode.
- Incorporates a Display which shows the Set-point Temperature or the measured one, as well as the Relative Humidity.
- It has 4 keys with preset functionality:



- Among their keys, there are 2 freely configurable buttons, which can be configured as Switch, Dimmer, Control of Blind / Shutter, Scenes, etc.
- Incorporate Temperature, Luminosity and Humidity sensors.
- Its main functionality is complemented by 4 Binary / Analog Inputs, which can be connected to a Door / Window Sensor or a DINUY Temperature Probe.
- Allows enabling and configuring one Heating and / or Cooling Thermostat.
- The 2 free-configuration buttons incorporate 2 configurable RGB LEDs.
- They do not need external supply, only the KNX Bus.
- Device designed for flush mounting into universal switch boxes.
- Programming and commissioning via ETS5 or later version.


- Technical specifications:

KNX	Supply voltage	21 ~ 32V <sub>DC</sub>
	Bus current	< 4mA
	Type of connection	KNX Bus terminal
	Programming by	ETS5 or later
	KNX Topology	TPI
	Commissioning	System-Mode
Inputs	Number of Inputs	4 Inputs for Door Contact or Temperature Probe
	Type	Binaries or Analogs
	Compatible Temperature Probes	ST KNT 001 and ST KNT 002
	Temperature Probe Range	-40°C bis +100°C
	Maximum length of the cable	<10m
Sensors	Temperature	-40°C bis +125°C // Accuracy: ±0,4°C (-10°C bis +85°C)
	Luminosity	0,045Lux bis 188.000Lux
	Relative Humidity	0% bis 100% // Accuracy: ±4% (0% bis 80%)
Display	From 0.0 to 99.9	
Dimensions	90 x 90 x 14mm	
Working Temperature	-5°C bis +45°C	
Storage Temperature	-30°C bis +70°C	
Degree of protection	IP20 (EN60529)	
Directives	Security 73/23/EEC EMC 204/108/EC	
Standards	KNX Standard 2.0 EN60669-1, 2-1 & 2-3	

## CONFIGURATION

### Device Configuration

An initial window is available where some main parameters can be set:

<ul style="list-style-type: none"> <li>- Device Configuration</li> <li style="background-color: #e0e0e0;">+ General Configuration</li> <li style="background-color: #e0e0e0;">+ Touch Configuration</li> <li style="background-color: #e0e0e0;">+ Configurable Buttons</li> <li style="background-color: #e0e0e0;">+ Internal Temperature Sensor</li> <li style="background-color: #e0e0e0;">+ Thermostat</li> <li style="background-color: #e0e0e0;">+ Humidity Sensor</li> <li style="background-color: #e0e0e0;">+ Brightness Sensor</li> <li style="background-color: #e0e0e0;">+ Twilight Function</li> <li style="background-color: #e0e0e0;">+ Inputs</li> </ul>	<p>Thermostat Model</p> <p> <input type="radio"/> TM KNT 002 (with Modes)  <input checked="" type="radio"/> TM KNT 001 (with Fan Speed)         </p> <hr/> <p>Display information</p> <p>Temperature visualization time: <input type="text" value="30"/> sec</p> <p>Humidity visualization time: <input type="text" value="5"/> sec</p> <hr/> <p>Buttons sound</p> <p>Enable sound when the key is pressed: <input checked="" type="radio"/> Enable <input type="radio"/> Disable</p> <p>Sound frequency: <input type="text" value="75Hz"/></p> <p>Sound duration: <input type="text" value="0.3 sec"/></p> <hr/> <p>+/- Buttons</p> <p>Maximum Heating Set-point: <input type="text" value="25"/> °C</p> <p>Minimum Heating Set-point: <input type="text" value="16"/> °C</p> <p>Maximum Cooling Set-point: <input type="text" value="30"/> °C</p> <p>Minimum Cooling Set-point: <input type="text" value="20"/> °C</p> <p>Step of Increase/Decrease: <input type="text" value="0,5"/> °C</p> <div style="text-align: center; margin-top: 20px;">  </div>
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#### General Configuration:

##### Thermostat Model:

- TM KNT 001: with button for setting the Fan-Coil Speed.
- TM KNT 002: with button for setting the HVAC Special Mode.

· **Display information:**

Display information	
Temperature visualization time	30 sec
Humidity visualization time	5 sec

- **Temperature visualization time:** Time during which the temperature of the room will be displayed.
- **Humidity visualization time:** Time during which the humidity of the room will be displayed.

· **Buttons sound:**

Buttons sound	
Enable sound when the key is pressed	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Sound frequency	75Hz
Sound duration	0.3 sec


- **Enable sound when the key is pressed:** An acoustic signal when any of the keys is pressed can be enabled.
- **Sound frequency:** The higher the frequency, the higher the buzzing.
- **Sound duration:** Sets the duration of the buzzing.

· **+/- Buttons:**

+/- Buttons	
Maximum Heating Set-point	25 °C
Minimum Heating Set-point	16 °C
Maximum Cooling Set-point	30 °C
Minimum Cooling Set-point	20 °C
Step of Increase/Decrease	0,5 °C

- **Maximum Heating Set-point:** Sets the maximum temperature setpoint for the Heating mode.
- **Minimum Heating Set-point:** Sets the minimum temperature setpoint for the Heating mode.
- **Maximum Cooling Set-point:** Sets the maximum temperature setpoint for the Cooling mode.
- **Minimum Cooling Set-point:** Sets the minimum temperature setpoint for the Cooling mode.
- **Step of Increase/Decrease:** Change in the setpoint each time the temperature setpoint keys are pressed.

## Touch Configuration:




Button "+" Sensitivity	High ▼
Button "-" Sensitivity	High ▼
Button "On/Off" Sensitivity	High ▼
Button "Speed" Sensitivity	High ▼
"Button 1" Sensitivity	High ▼
"Button 2" Sensitivity	High ▼
Enable Water protection	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

- **Sensitivity:** Determines the sensitivity of each key.
- **Enable Water protection:** The operation of the keys can be automatically disabled if some water is detected on the surface of the button. If this function is disabled, the pushbutton may work incorrectly when, for example, is trying to operate with wet hands.

## Configurable Buttons - Configuration

The Thermostat has 2 freely configurable keys, with their corresponding RGB LEDs:

- + Device Configuration
- Configurable Buttons
  - Button 1
    - LED "Button 1" Configuration
    - Button 2
    - LED "Button 2" Configuration
- + Internal Temperature Sensor
- + Thermostat
- + Humidity Sensor
- + Brightness Sensor
- + Twilight Function
- + Inputs



Function of Channel	Dimmer
Show "Disable Button" object	<input type="checkbox"/>
Debounce time	10 msec
Contact type	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
Dimming Functionality	<input checked="" type="radio"/> Dimming and Switching <input type="radio"/> Only Dimming
Long Press after...	1 sec
Short Press	Toggle
Long Press	Dimming Up/Down

· **Function of Channel:**

Function of Channel	<div style="border: 1px solid #ccc; padding: 5px;"> <div style="background-color: #e0e0e0; padding: 2px;">Dimmer ▾</div> <div style="padding: 2px;">Not assigned</div> <div style="padding: 2px;">Switch</div> <div style="background-color: #e0e0e0; padding: 2px;">Dimmer ✓</div> <div style="padding: 2px;">Multiple Switch</div> <div style="padding: 2px;">Shutter/Blind</div> <div style="padding: 2px;">Scene Control</div> <div style="padding: 2px;">Fixed/Forced Value</div> </div>
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· **Switch:**

Function of Channel	Switch
Show "Disable Button" object	<input type="checkbox"/>
Contact type	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
Debounce time	10 msec
Distinction between Short and Long Press	<input type="checkbox"/>
Cyclic transmission	No
Action on Closing the contact	On
Action on Opening the contact	On
Transmit State after recovering bus voltage	<input type="checkbox"/>

- **Show "Disable Button" object:** Allows activating/deactivating the key through the object "[PB] Disable Button". Writing a "0" in this object, the key will be enabled, while if a "1" is written the key will be disabled and will not send telegrams to the bus.
- **Contact type:** Sets if it is a Normally Open or Normally Closed contact.
- **Debounce time:** Parameter to adjust the bounce suppression time when there is a switch. Prevents multiple unwanted actions, caused by the rebound when a contact is closed.
- **Distinction between Short and Long Press:** Allows distinguishing between a short and a long press. In this way, it is possible to trigger 2 different actions depending on the length of the action.

- If there is no distinction between Short and Long press:

- **Cyclic transmission:** Sets the cyclical sending of the object "[PB] Press".

Cyclic transmission	No No <input checked="" type="checkbox"/> If OFF state If ON state Yes
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- No: It will not be updated cyclically, but state transmission can be enabled after recovering bus voltage.
- If OFF state: The object "[PB] Press" will be cyclically sent if its value is "0".
- If ON state: The object "[PB] Press" will be cyclically sent if its value is "1".
- Yes: The object "[PB] Press" will be cyclically sent if its value is "0" or "1".

- **Action on Closing the contact:** Action to be carried out when the key is pressed.

Action on Closing the contact	On On <input checked="" type="checkbox"/> Off Toggle None
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- **Action on Opening the contact:** Action to be carried out when the key is released.

Action on Opening the contact	<div style="border: 1px solid #ccc; padding: 5px;"> <div style="background-color: #e0e0e0; padding: 2px;">On</div> <div style="background-color: #e0e0e0; padding: 2px;">On <span style="float: right;">✓</span></div> <div style="padding: 2px;">Off</div> <div style="padding: 2px;">Toggle</div> <div style="padding: 2px;">None</div> </div>
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- If there is distinction between Short and Long press:

Distinction between Short and Long Press	<input checked="" type="checkbox"/>
Number of objects for Short/Long Press	<input checked="" type="radio"/> 1 <input type="radio"/> 2
Long Press after...	1 sec
Long Press	On
Short Press	Toggle

- **Number of objects for Short/Long Press:**

- 1 object: “[PB] Press” → Only 1 object for short or long press.
- 2 objects: “[PB] Short Press: Switch” and “[PB] Long Press: Switch” → Each action has its own dedicated object.

- **Long Press after...:** Sets the minimum time that a press should last to consider it as a long action.
- **Long Press:** action to be carried out when a long press is detected.

Long Press	<div style="border: 1px solid #ccc; padding: 5px;"> <div style="background-color: #e0e0e0; padding: 2px;">On</div> <div style="background-color: #e0e0e0; padding: 2px;">On <span style="float: right;">✓</span></div> <div style="padding: 2px;">Off</div> <div style="padding: 2px;">Toggle</div> <div style="padding: 2px;">None</div> </div>
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- **Short Press:** action to be carried out when a short press is detected.

Short Press	<div style="border: 1px solid #ccc; padding: 5px;"> <div style="background-color: #e0e0e0; padding: 2px;">Toggle</div> <div style="padding: 2px;">On</div> <div style="padding: 2px;">Off</div> <div style="background-color: #e0e0e0; padding: 2px;">Toggle <span style="float: right;">✓</span></div> <div style="padding: 2px;">None</div> </div>
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· **Dimmer:**

Function of Channel	Dimmer
Show "Disable Button" object	<input checked="" type="checkbox"/>
Debounce time	10 msec
Contact type	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
Dimming Functionality	<input checked="" type="radio"/> Dimming and Switching <input type="radio"/> Only Dimming
Long Press after...	1 sec
Short Press	Toggle
Long Press	Dimming Up/Down

- **Show "Disable Button" object:** Allows activating/deactivating the key through the object "[PB] Disable Button". Writing a "0" in this object, the key will be enabled, while if a "1" is written the key will be disabled and will not send telegrams to the bus.
- **Debounce time:** Parameter to adjust the bounce suppression time when there is a switch. Prevents multiple unwanted actions, caused by the rebound when a contact is closed.
- **Contact type:** Sets if it is a Normally Open or Normally Closed contact.
- **Dimming Functionality:** Allows selecting if only dimming telegrams will be sent or also switching ones.
- **Long Press after...:** Sets the minimum time that a press should last to consider it as a long action.
- **Short Press:** Action to be carried out when a short press is detected.

Short Press	Toggle On Off Toggle <input checked="" type="checkbox"/> None
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- **Long Press:** action to be carried out when a long press is detected.

Long Press	Dimming Up/Down Dimming Up/Down <input checked="" type="checkbox"/> Dimming Up Dimming Down
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· **Multiple Switch:**

Function of Channel	Multiple Switch
Show "Disable Button" object	<input checked="" type="checkbox"/>
Debounce time	10 msec
Contact type	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
Maximum time between two press	0.5 sec
Number of Press	2
Action Press 1	On
Action Press 2	On

- **Show "Disable Button" object:** Allows activating/deactivating the key through the object "[PB] Disable Button". Writing a "0" in this object, the key will be enabled, while if a "1" is written the key will be disabled and will not send telegrams to the bus.
- **Debounce time:** Parameter to adjust the bounce suppression time when there is a switch. Prevents multiple unwanted actions, caused by the rebound when a contact is closed.
- **Contact type:** Sets if it is a Normally Open or Normally Closed contact.
- **Maximum time between two press:** Maximum time between 2 consecutive press to understand that they belong to the same sequence.
- **Number of Press:** Number of press which defines the sequence.
- **Action Press 1..4:** Function that performs each of the consecutive actions.

Action Press 1	<div style="border: 1px solid #ccc; padding: 2px;"> <div style="background-color: #f0f0f0; padding: 2px;">On</div> <div style="background-color: #e0e0e0; padding: 2px;">On <input checked="" type="checkbox"/></div> <div style="background-color: #f0f0f0; padding: 2px;">Off</div> <div style="background-color: #f0f0f0; padding: 2px;">Toggle</div> </div>
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· **Shutter/Blind:**

Function of Channel	Shutter/Blind
Show "Disable Button" object	<input checked="" type="checkbox"/>
Debounce time	10 msec
Contact type	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
Functional Construction	1 Pushbutton
Shutter Control Functionality	Short=Step, Long=Move
Long Press after...	1 sec

- **Show "Disable Button" object:** Allows activating/deactivating the key through the object "[PB] Disable Button". Writing a "0" in this object, the key will be enabled, while if a "1" is written the key will be disabled and will not send telegrams to the bus.
- **Debounce time:** Parameter to adjust the bounce suppression time when there is a switch. Prevents multiple unwanted actions, caused by the rebound when a contact is closed.
- **Contact type:** Sets if it is a Normally Open or Normally Closed contact.
- **Functional Construction:** Determines the operation of the key, such as Pushbutton or Switch, single or double.

Functional Construction	1 Pushbutton 1 Pushbutton <input checked="" type="checkbox"/> 1 Switch Move 2 Pushbuttons 2 Switches Move 2 Pushbuttons Step 2 Pushbuttons Move
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- **1 Pushbutton:** sends Move Up/Down or Step telegrams, depending on the duration of the press. This function is useful when a blind must be controlled from a single button.

Shutter Control Functionality	Short=Step, Long=Move Short=Step, Long=Move <input checked="" type="checkbox"/> Short=Move, Long=Step Up-Stop-Down-Stop
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- **1 Switch Move:** sends Move Up/Down telegrams. This function is useful when a blind must be controlled from a single switch. Step telegrams are not sent.
- **2 Pushbuttons:** sends Move Up/Down or Step telegrams, depending on the duration of the press. This function is useful when a blind must be controlled by two different buttons, one for Move Up and another one for Move Down.

Short Press	<input checked="" type="radio"/> Step Down <input type="radio"/> Step Up
Long Press	<input checked="" type="radio"/> Move Up <input type="radio"/> Move Down
Long Press after...	1 sec <span style="float: right;">▼</span>

- **2 Switches Move** sends Move Up/Down telegrams. This function is useful when a blind must be controlled by two different switches, one for Move Up and another one for Move Down.

Long Press	<input checked="" type="radio"/> Move Up <input type="radio"/> Move Down
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- **2 Pushbuttons Step:** sends Step Up/Down telegrams. This function is useful when a blind must be controlled by two different buttons, one for Step Up and another one for Step Down.

Short Press	<input checked="" type="radio"/> Step Down <input type="radio"/> Step Up
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- **2 Pushbuttons Move:** sends Move Up/Down telegrams. This function is useful when a blind must be controlled by two different buttons, one for Move Up and another one for Move Down.

Long Press	<input checked="" type="radio"/> Move Up <input type="radio"/> Move Down
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· **Scene Control:**

Function of Channel	Scene Control
Show "Disable Button" object	<input checked="" type="checkbox"/>
Debounce time	10 msec
Contact type	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
Type of Scene Control	<input checked="" type="radio"/> 8 Bits Scene <input type="radio"/> 1 Bit Scene
Scene number	1
Short Press	<input checked="" type="radio"/> Call <input type="radio"/> Ignore
Save Scene	No

- **Show "Disable Button" object:** Allows activating/deactivating the key through the object "[PB] Disable Button". Writing a "0" in this object, the key will be enabled, while if a "1" is written the key will be disabled and will not send telegrams to the bus.
- **Debounce time:** Parameter to adjust the bounce suppression time when there is a switch. Prevents multiple unwanted actions, caused by the rebound when a contact is closed.
- **Contact type:** Sets if it is a Normally Open or Normally Closed contact.
- **Type of Scene Control:**

- **8 Bits Scene:**

Type of Scene Control	<input checked="" type="radio"/> 8 Bits Scene <input type="radio"/> 1 Bit Scene
Scene number	1
Short Press	<input checked="" type="radio"/> Call <input type="radio"/> Ignore
Save Scene	No

- **Scene number:** assigns a Scene number to the input. It can be an 8-bit scene (1 – 64).
- **Short Press:** allows assigning a specific function to a short pressing: recover a scene or ignore it.
- **Save Scene:**

Save Scene	<div style="border: 1px solid gray; padding: 5px;"> <div style="background-color: #e0e0e0; padding: 2px;">No</div> <div style="background-color: #e0e0e0; padding: 2px; border-bottom: 1px solid gray;">No <input checked="" type="checkbox"/></div> <div style="padding: 2px;">On Long Press</div> <div style="padding: 2px;">With Object value = 1</div> <div style="padding: 2px;">On Long Press if Object value = 1</div> </div>
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- **No:** the Scene cannot be saved through the key.
- **On Long Press:** the Scene is saved after a long press.
- **With Object value = 1:** the scene is saved setting when the object "[PB] Long Press: Save Scene" is "1".
- **On Long Press if Object value = 1:** the scene is saved with a long pressing if the object "[PB] Long Press: Save Scene" is "1".

○ **1 Bit Scene:**

Type of Scene Control	<input type="radio"/> 8 Bits Scene <input checked="" type="radio"/> 1 Bit Scene
Scene number 1/2	1
Save Scene on Long Press	<input type="checkbox"/>


- **Scene number 1/2:** assigns a Scene number to the input. It can be an 1-bit (1 or 2) scene.
- **Save Scene on Long Press:** a long press will save the current Scene.

· **Fixed/Forced Value:**

Function of Channel	Fixed/Forced Value
Show "Disable Button" object	<input checked="" type="checkbox"/>
Debounce time	10 msec
Contact type	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
Distinction between Short and Long Press	<input checked="" type="checkbox"/>
Value type on Short Press	1 Bit
Bit value	<input checked="" type="radio"/> 0 <input type="radio"/> 1
Value type on Long Press	1 Bit
Bit value	<input checked="" type="radio"/> 0 <input type="radio"/> 1
Long Press after...	1 sec

- **Show "Disable Button" object:** Allows activating/deactivating the key through the object "[PB] Disable Button". Writing a "0" in this object, the key will be enabled, while if a "1" is written the key will be disabled and will not send telegrams to the bus.
- **Debounce time:** Parameter to adjust the bounce suppression time when there is a switch. Prevents multiple unwanted actions, caused by the rebound when a contact is closed.
- **Contact type:** Sets if it is a Normally Open or Normally Closed contact.
- **Distinction between Short and Long Press:** allows to distinguish between a short and a long pressing. This way, if the differentiation is made, two different actions can be carried out depending on the length of the press. Two different objects will be available.
- **Value type on Short Press:** determines the type of value that will be sent via the object "[PB] Short Press: X value".
- **Value type on Long Press:** determines the type of value that will be sent via the object "[PB] Long Press: X value".

## Configurable Buttons – LED Configuration

<ul style="list-style-type: none"> <li>+ Device Configuration</li> <li>- Configurable Buttons <ul style="list-style-type: none"> <li>Button 1</li> <li style="background-color: #e0e0e0;">LED "Button 1" Configuration</li> <li>Button 2</li> <li>LED "Button 2" Configuration</li> </ul> </li> <li>+ Internal Temperature Sensor</li> <li>+ Thermostat</li> <li>+ Humidity Sensor</li> <li>+ Brightness Sensor</li> <li>+ Twilight Function</li> <li>+ Inputs</li> </ul>			
	LED control	<input checked="" type="radio"/> Via communication object <input type="radio"/> When the button is pressed	
	LED ON when...	<input type="radio"/> "0" <input checked="" type="radio"/> "1"	
	ON State		
	ON state brightness %	50	
	ON state Red LED %	0	
	ON state Green LED %	100	
	ON state Blue LED %	0	
	LED Functionality	<input checked="" type="radio"/> Permanent <input type="radio"/> Flashing	
	OFF State		
	OFF state brightness %	50	
	OFF state Red LED %	0	
	OFF state Green LED %	100	
	OFF state Blue LED %	0	
	LED Functionality	<input checked="" type="radio"/> Permanent <input type="radio"/> Flashing	

- **LED control:** Allows parameterizing the activation of the button's LED.
  - **Via communication object:** the object "[PB] LED "Button X" is enabled whereby the LED can be switched on or off. It will also be possible to set the polarity of the object through the parameter "LED ON when...".
  - **When the button is pressed:** the illumination of the key depends on whether it is physically pressed, or not.
- **ON / OFF State:** Determines the status of the LED: brightness level, RGB color and behavior, when the key is active or not (object at 0/1 or the key is pressed / not pressed).



## Internal Temperature Sensor

+ Device Configuration	Enable Temperature Sensor	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
+ Configurable Buttons	Temperature Sensor calibration value	0 [x 0,1°C]
- Internal Temperature Sensor	"Temperature Sensor" enabled after recovering bus voltage	<input checked="" type="checkbox"/>
<b>Configuration</b>		
+ Thermostat	Base time to send Temperature	1 min
	Factor (Total time = Base x Factor)	1 (0=Disable)
+ Humidity Sensor	Temperature variation for sending value	5 x 0,1°C (0=Disable)
+ Brightness Sensor	Protection Alarms	No protection
+ Twilight Function		
+ Inputs		

- **Enable Temperature Sensor:** The built-in temperature sensor can be enabled, or not, depending if it will be used as the temperature source for the Thermostat control.
- **Temperature Sensor calibration value:** A correction can be added or subtracted (between -5°C and + 4.9°C) to the measurement received from the built-in sensor, in the event that there is a deviation between this value and the real temperature of the room.
- **"Temperature Sensor" enabled after recovering bus voltage:** Determines if temperature sensor functionality will be enabled after recovering bus voltage.
- **Base time to send Temperature:** How often the temperature value is sent. The time between each transmission results from the multiplication "Base" x "Factor".
- **Temperature variation for sending value:** Measured temperature sending when it changes a certain value. If the difference from the last measurement is higher than the set value, the temperature will be sent before the sending period elapses.
- **Protection Alarms:**

Protection Alarms	Over-Heating and Over-Cooling
Over-Heating Temperature	45 [x 1°C]
Over-Cooling Temperature	-29 [x 1°C]
Hysteresis	0 [x 0,1°C]

- **Over-Heating Temperature:** When this value is reached the "[Temp] Temperature Sensor Over-Heating" object is set to "1".
- **Over-Cooling Temperature:** When this value is reached the "[Temp] Temperature Sensor Over-Cooling" object is set to "1".
- **Hysteresis:** A value, in tenths of a degree, to prevent successive resending of the object in case the temperature fluctuates continuously around the threshold.

## Thermostat

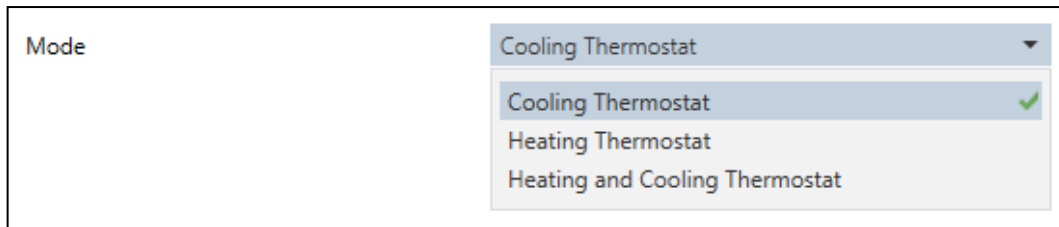
The parameters are divided into 3 defined blocks:

- Configuration: a series of general parameters should be configured (thermostat type, temperature source, window alarm...).
- Cooling / Heating Set-point: the parameters related to the Heating or Cooling Setpoint are set.
- Fan-Coil Control: Fan-Coil control parameters.

+ Device Configuration	Enable Thermostat	<input checked="" type="checkbox"/>
+ Configurable Buttons	Mode	Cooling Thermostat ▾
+ Internal Temperature Sensor	Set-point mode	<input checked="" type="radio"/> Absolute Set-point mode <input type="radio"/> Relative Set-point Mode
- Thermostat	Initial Set-point after recovering bus voltage	24 [x 1°C]
<div style="background-color: #e0e0e0; padding: 2px; margin-bottom: 2px;"><b>Configuration</b></div> <div style="background-color: #e0e0e0; padding: 2px; margin-bottom: 2px;">Cooling Set-point</div> <div style="background-color: #e0e0e0; padding: 2px;">Fan-Coil Control</div>	Enable Window protection	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
+ Humidity Sensor	Enable 1 Bit mode objects	Disable ▾
+ Brightness Sensor	Reference Temperature Source	One Source ▾
+ Twilight Function	Thermostat always On	<input type="checkbox"/>
+ Inputs	State after recovering bus voltage	Off ▾
	Enable Turn-on Thermostat when Special commands arrive	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
	Send Thermostat Mode after recovering bus voltage	<input type="checkbox"/>

## Thermostat - Configuration:

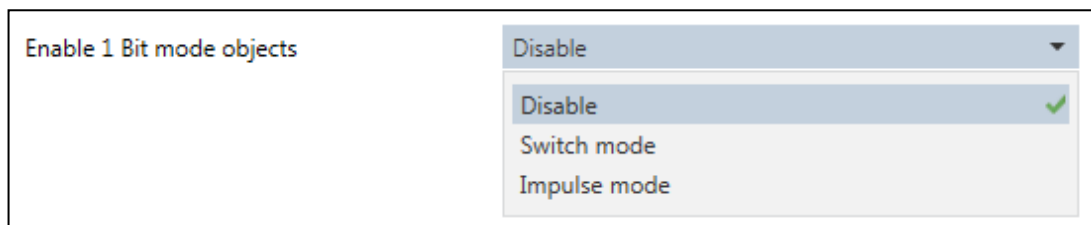
- **Enable Thermostat:** enable/disable the Thermostat functionality.
- **Mode:** which of the two main climate working modes will be available, so that the thermostat can manage situations of hot, cool, or both, respectively.



- **Set-point mode:** cooling or heating setpoint temperature can be set according to two modes: Absolute or Relative.
- **Initial Set-point after recovering bus voltage:** sets the initial setpoint after the bus voltage is recovered.
  - If “Absolute Set-point mode” has been selected, this value will be the initial setpoint.
  - If “Relative Set-point mode” has been selected, this value will be the initial setpoint for the Comfort mode.
- **Enable Window protection:** activates/deactivates protection mode in the event of an unusual situation, for example, an open or broken window. It is a protection in preference to the rest of the modes, therefore no other special mode can be activated until the Window Alarm Input changes to "0".

Once this option is enabled, there are four 1-bit objects "[Th] Window Alarm I..4 Input" that allow monitoring up to 4 different windows.

- **Enable 1 Bit mode objects:** allows to select the desired mode through 4 different 1-bit objects "[Th] Special mode Comfort / Stand-by / Economy / Protection".



However, there is a 1-byte input object “[Th] Special mode Input 1 Byte” by default. This object acts over all the bits at the same time and would overlap what has been written with the 1-bit objects. 1-bit objects only write to their mode bit. It can take the following values:

- 00: Auto
- 01: Comfort
- 02: Stand-by
- 03: Economy
- 04: Protection

The four 1-bit objects can work in 2 different ways:

- Switch mode: setting “1” to any of the four 1-Bit objects, the corresponding special mode will be activated. The “0” deactivates the corresponding mode. If a “1” is set in one bit, and then another “1” in another bit, the one with the highest priority will be activated. To remove the “1” from a bit, a “0” must be sent. The order of priority is as follows: Protection > Comfort > Stand-by > Economy.
- Trigger mode: setting “1” to any of the four 1-Bit objects, the corresponding special mode will be activated. The “0” will have no function. By setting a “1” to one bit, as soon as the mode is activated it is automatically set to “0”, so if another bit is then activated to “1”, there will not be two bits to “1”, only the last one.

- **Reference Temperature Source:** sets the source of the temperature value to be taken as the reference. This value can come from a single source, through the 2-byte object “[Th] Temperature Sensor 1”, or from the combination of 2 objects in the set proportions. This second value will be established by the 2-byte object: “[Th] Temperature Sensor 2”.

- **Thermostat always On:** it defines if the thermostat will always remain on or if the possibility of switching on/off is given. If this option is not marked, two 1-bit objects will be enabled to activate it: “[Th] On / Off Input” and “[Th] On / Off Feedback”. In addition, there will be 2 more parameters to be parameterized:

- **State after recovering bus voltage:** sets the state the thermostat will return when the bus voltage is restored.

- **Enable Turn-on Thermostat when Special commands arrive:** in case the thermostat is turned off, it will automatically turn on when an activation order of a special mode arrives.

- **Send Thermostat Mode after recovering bus voltage:** establishes the sending, or not, of the Mode in which the Thermostat is after recovering the bus voltage.
- **Enable automatic mode change:** defines if the Thermostat changes automatically from one mode to the other one (Heating / Cooling) depending on the setpoint and reference temperatures, or if the change is made manually, through the object “[Th] Heating or Cooling Mode”.

If the change is made manually, a “0” in the object “[Th] Heating or Cooling Mode” will activate the Cooling mode, and a “1” will activate the Heating mode.

If on the contrary, the change is made automatically:

- Reference Temperature > Cooling Setpoint → Cooling mode
- Reference Temperature < Heating Setpoint → Heating mode

- **Thermostat Type after recovering bus voltage:** defines the thermostat operating mode, Heating / Cooling, after bus voltage recovery.
- **Control object:** establishes if there is only one output object, “[Th] Output”, or if there are different objects for each mode, “[Th] Heating Output” and “[Th] Cooling Output”. This parameter will only be available in the TM KNT 002 model (with Modes).

## Thermostat – Set-points:

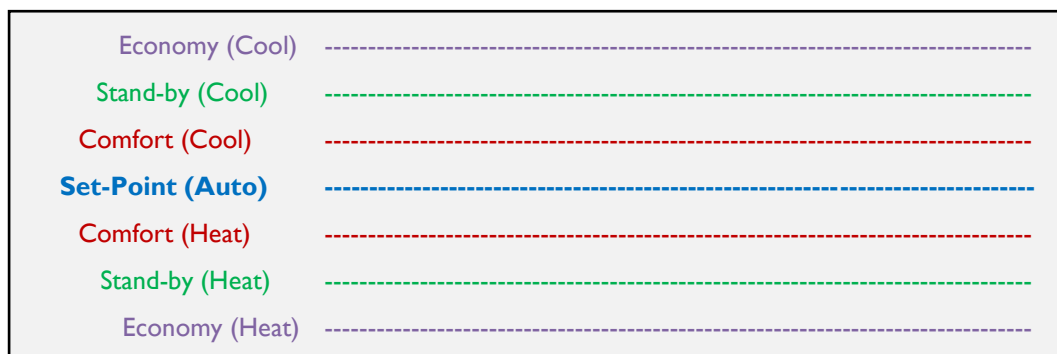
- Device Configuration	Cooling Set-point		
General Configuration	Set-point Offset for Stand-by mode	40	[x 0,1°C]
Touch Configuration	Set-point Offset for Economy mode	60	[x 0,1°C]
+ Configurable Buttons	Over-Temperature protection Set-point	40	[x 1°C]
+ Internal Temperature Sensor	Heating Set-point		
- Thermostat	Set-point Offset for Stand-by mode	-40	[x 0,1°C]
Configuration	Set-point Offset for Economy mode	-60	[x 0,1°C]
Set-point	Set-point for protection from Freezing	8	[x 1°C]
Regulation Mode			
+ Humidity Sensor			
+ Brightness Sensor			
+ Twilight Function			
+ Inputs			

## Heating / Cooling Set-point

### Absolute Set-point mode

- The setpoints for cooling or heating are defined as absolute values. Total control over the desired temperature in the room is achieved, since the thermostat regulates the room temperature based on the temperature setpoint set every moment.
- Via the 2-byte communication object “[Th] Set-point Input” the desired temperature is set through the bus. Depending on the set value and the parameterized setpoints for each special mode, one mode or another will be established.
- A setpoint value is also defined for the Comfort special mode, from which the setpoints of the other special modes will be defined: Stand-by and Economy.
- Protection mode, of heating or cooling, is defined in absolute values.

Cooling Set-point	
Comfort Set-point	<input type="text" value="21"/> [x 1°C]
Set-point Offset for Stand-by mode	<input type="text" value="40"/> [x 0,1°C]
Set-point Offset for Economy mode	<input type="text" value="60"/> [x 0,1°C]
Over-Temperature protection Set-point	<input type="text" value="40"/> [x 1°C]
Heating Set-point	
Comfort Set-point	<input type="text" value="21"/> [x 1°C]
Set-point Offset for Stand-by mode	<input type="text" value="-40"/> [x 0,1°C]
Set-point Offset for Economy mode	<input type="text" value="-60"/> [x 0,1°C]
Set-point for protection from Freezing	<input type="text" value="8"/> [x 1°C]



- **Comfort Set-point:** The temperature under this special mode must guarantee the comfort of the people present in the room. This mode is intended to perform usual climate control when the room is being occupied.
- **Set-point Offset for Stand-by mode:** This mode is intended for short periods during which the room remains empty. A standby or standby temperature is enabled that will allow energy savings. This value should be set by means of an offset relative to the absolute setpoint defined for the Comfort mode according to the parameterized operating mode (cooling, heating or both, in which case it will be necessary to define a Comfort setpoint for

heating and another for cooling). This mode is usually used when the room is going to be empty for a short period of time.

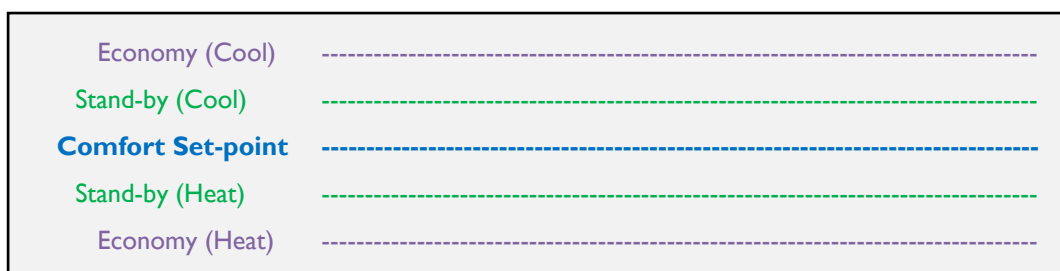
- **Set-point Offset for Economy mode:** This mode is usually used when the air-conditioned room is going to be empty for longer periods of time. This value will be set by means of an offset relative to the absolute setpoint defined for the Comfort mode according to the parameterized operating mode (cooling, heating or both, in which case it will be necessary to define a Comfort setpoint for heating and another for cooling).
- **Protection Set-point:** This value will be activated in case of adverse climate conditions, excessive heat or cold, mainly due to some unusual external situation (such as a broken window) or because the room is going to remain empty for a long time. The thermostatic control will only be activated if the thermostat is on and with the protection mode activated and when the room temperature is actually above or below the parameterized protection setpoints, thus avoiding excessive energy consumption.

## Relative Mode Set-point

- It consists of the application of set-points in relative terms, that is, a Comfort set-point temperature will be set by parameter and each of the set-points of the modes is configured by a relative offset with respect to this base reference, both for cooling and for heating.
- With the 2-byte communication object "[Th] Comfort Set-point Input" the Comfort set-point is set via bus, which will be taken as a reference to define the other special modes.
- Protection mode, for heating or cooling, is defined in absolute values.

Set-point mode	<input type="radio"/> Absolute Set-point mode <input checked="" type="radio"/> Relative Set-point Mode
Initial Comfort Set-point after recovering bus voltage	<input type="text" value="21"/> [x 1°C]

Cooling Set-point	
Set-point Offset for Stand-by mode	<input type="text" value="40"/> [x 0,1°C]
Set-point Offset for Economy mode	<input type="text" value="60"/> [x 0,1°C]
Over-Temperature protection Set-point	<input type="text" value="40"/> [x 1°C]
Heating Set-point	
Set-point Offset for Stand-by mode	<input type="text" value="-40"/> [x 0,1°C]
Set-point Offset for Economy mode	<input type="text" value="-60"/> [x 0,1°C]
Set-point for protection from Freezing	<input type="text" value="8"/> [x 1°C]



- **Initial Comfort Set-point after recovering bus voltage:** Initial setpoint for Comfort mode which will be taken as base reference for the other modes, with the exception of Protection mode.

- **Offset for Stand-by Set-point mode:** This value will be set by a relative offset from the absolute setpoint defined for the Comfort mode according to the parameterized operating mode (cool, heat or both, in which case it will be necessary to define a Comfort setpoint for heating and another for cooling). This mode is usually used when the room is going to be empty for a short period of time. A standby temperature is enabled allowing energy savings.
- **Offset for Economy Set-point mode:** This value will be set by a relative offset from the absolute setpoint defined for the Comfort mode according to the parameterized operating mode (cool, heat or both, in which case it will be necessary to define a Comfort setpoint for heating and another for cooling). This mode is usually used when the room is going to be empty for longer periods of time, for example, when people will not use the room again until the next day.
- **Protection Set-point:** This value will be activated in case of adverse climate conditions, excessive heat or cold, mainly due to some abnormal external situation (such as a broken window) or because the room is going to remain empty for a long time. The thermostatic control will only be activated if the thermostat is on and with the protection mode activated and when the room temperature is really above or below the parameterized protection setpoints, thus avoiding excessive energy consumption.



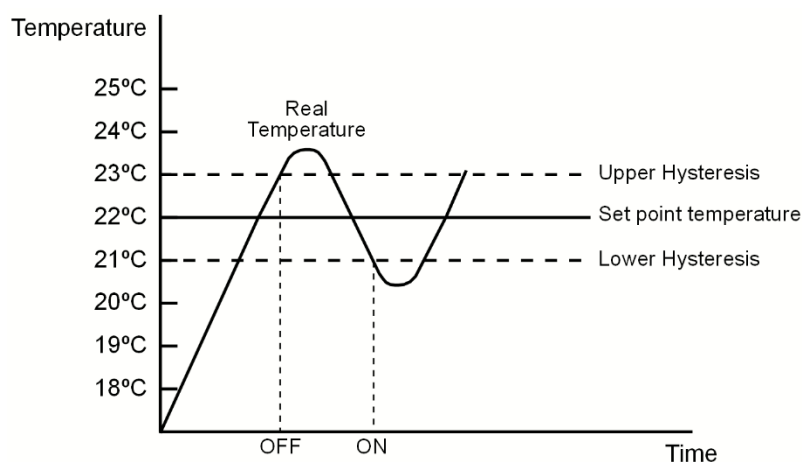
## Thermostat – Regulation Mode (TM KNT 002):

- Device Configuration	Cooling regulation	
General Configuration	Regulation Mode	<input checked="" type="radio"/> 2-point control with Hysteresis <input type="radio"/> PI Control
Touch Configuration	Upper Hysteresis	10 [x 0,1°C]
+ Configurable Buttons	Lower Hysteresis	10 [x 0,1°C]
+ Internal Temperature Sensor	Forwarding period (0=Disable)	0 [x 1 min]
- Thermostat	Heating Regulation	
Configuration	Regulation Mode	<input checked="" type="radio"/> 2-point control with Hysteresis <input type="radio"/> PI Control
Set-point	Upper Hysteresis	10 [x 0,1°C]
Regulation Mode	Lower Hysteresis	10 [x 0,1°C]
Humidity Sensor	Forwarding period (0=Disable)	0 [x 1 min]
Brightness Sensor		
Twilight Function		
Inputs		

- Thermostatic control can be carried out in 2 different algorithms:
  - 2-point Hysteresis Control.
  - PI control.

### 2-point Hysteresis Control

It is a simple control method, widely used in conventional thermostats, where the Set-point Temperature and two values of hysteresis around the setpoint are required. It prevents a continuous switching between the two modes.



Regulation Mode	<input checked="" type="radio"/> 2-point control with Hysteresis	<input type="radio"/> PI Control
Upper Hysteresis	<input type="text" value="10"/>	[x 0,1°C]
Lower Hysteresis	<input type="text" value="10"/>	[x 0,1°C]
Forwarding period (0=Disable)	<input type="text" value="0"/>	[x 1 min]

## PI Control (Proportional – Integral)

More advanced and accurate linear control than the 2-point hysteresis control, since besides taking into account the difference between the temperature setpoint and the actual temperature, it takes into account previous states or differences.

$$\% \text{ Output} = \% \text{ Temperature Difference} + \% \text{ Integral}$$

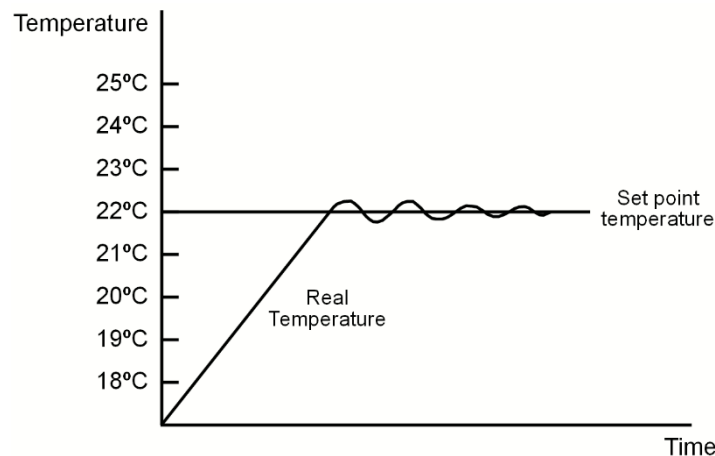
Where:

$$\% \text{ Temperature Difference} = (\text{Current Temperature} - \text{Temperature Set-point}) / \text{Proportional Band (K)}$$

% Integral:

- Maximum integral component (%): limits the maximum value of % Integral. It depends on how the real temperature approaches the Setpoint.
- Attenuation factor: atenúa el % Integral. the higher this value, the % Integral will have less weight.

In this way, the oscillations with respect to the setpoint value are reduced and the ambient temperature becomes progressively stable around the setpoint.



Regulation Mode	<input type="radio"/> 2-point control with Hysteresis	<input checked="" type="radio"/> PI Control
PWM type	<input type="radio"/> PWM (1 Bit)	<input checked="" type="radio"/> 1 Byte (%)
PI Cycle Time	<input type="text" value="15"/>	[x 1 min]
Proportional band	<input type="text" value="5"/>	[x 1°C]
Attenuation factor	<input type="text" value="31"/>	
Maximum integral component (%)	<input type="text" value="21"/>	

- **PWM Type:**

- **PWM (1 Bit):** control by Pulse Width Modulation. One 1-Bit object "[Th] Cooling / Heating Output" will be available to control on/off valves, not allowing intermediate positions. Therefore, partial opening of the valve is emulated by opening and closing it for similar portions of time.
- **1 Byte (%):** the control object "[Th] Cooling / Heating Output" will be a 1-Byte percentage value. It will indicate how much (%) the valve should open, as long as the valve admits this positioning.

- **PI Cycle Time:** this time is considered for setting the temperature sampling frequency and therefore the update frequency of the control signal. High values should be selected for systems with high thermal inertia (~ 20min) and lower values for systems with lower thermal inertia (~10min).

- **Proportional Band:** resulting value between the setpoint temperature and the actual temperature from which the proportional integral value will be applied.
  - If the difference between the actual temperature and the setpoint temperature is **higher** than the parameter "Proportional band", the Thermostat output will be 100%.
  - If the difference between the actual temperature and the setpoint temperature is **lower** than the parameter "Proportional band", the Thermostat output will be the result of the addition of two values:
    - **Proportional value:** The Proportional value (rule of three) between the difference "Setpoint temperature" - "Actual temperature" in the case of heating thermostat, or "Actual temperature" - "Setpoint temperature" in the case of cooling thermostat, with respect to the parameter "Proportional band".
    - **Integral value:** This value is the result of adding the difference between the "Actual Temperature" and the "Setpoint temperature" in each integration cycle. The "Attenuation Factor" is applied to this sum and the resulting value is added to the "Proportional Value" if it is less than the "Maximum Integral Component" value. Otherwise, the value "Maximum Integral Component" is added.

The result can never be higher than 100%.

- **Attenuation factor:** attenuation that is applied to the Integral value before adding it to the Proportional value.
- **Maximum Integral component (%):** Integral value limitation.

## Thermostat – Fan-Coil Control (TM KNT 001):

The Fan-Coil is a system that controls the flow of cooling / heating fluid through a valve (2 tubes) or two valves (4 tubes).

The liquid exchanges heat / cold with the environment through a ventilation system controlled by a fan, which can usually be enabled 3 different velocities.

+ Device Configuration	"Fan On/Off" object ON after recovering bus voltage <input checked="" type="checkbox"/>
+ Configurable Buttons	Heat / Cool System <input checked="" type="radio"/> 2 pipes <input type="radio"/> 4 pipes
+ Internal Temperature Sensor	Fan-Coil Type <input checked="" type="radio"/> Control On/Off <input type="radio"/> PI Control
- Thermostat	Fan-Coil Speed Output objects <input checked="" type="radio"/> Only one active each Speed <input type="radio"/> Active in accumulative way
Configuration	Valve independent control <input type="checkbox"/>
Set-point	
<b>Fan-Coil Control</b>	
+ Humidity Sensor	HEATING
+ Brightness Sensor	Forwarding period (0=Disable) <input type="text" value="0"/> [x 1 min]
+ Twilight Function	FAN SPEED SETTINGS Heating
+ Inputs	Upper Hysteresis to activate Speed 1 <input type="text" value="10"/> [x 0,1°C]
	Lower Hysteresis to activate Speed 1 <input type="text" value="10"/> [x 0,1°C]
	Offset from Set-point to activate Speed 2 <input type="text" value="-30"/> [x 0,1°C]
	Offset from Set-point to activate Speed 3 <input type="text" value="-50"/> [x 0,1°C]
	COOLING
	Forwarding period (0=Disable) <input type="text" value="0"/> [x 1 min]
	FAN SPEED SETTINGS Cooling
	Upper Hysteresis to activate Speed 1 <input type="text" value="10"/> [x 0,1°C]
	Lower Hysteresis to activate Speed 1 <input type="text" value="10"/> [x 0,1°C]
	Offset from Set-point to activate Speed 2 <input type="text" value="30"/> [x 0,1°C]
	Offset from Set-point to activate Speed 3 <input type="text" value="50"/> [x 0,1°C]

- **“Fan On/Off” object ON after recovering bus voltage:** Allows switching the Fan ON through the object “[Fancoil] Fan On (Auto) / Off” after recovering the bus voltage. It would start in Auto speed.
- **Heat / Cool System:** Establishes the number of pipes of the Fan-Coil, 2 pipes (1 valve: heating or cooling) or 4 pipes (2 valves: heating and cooling).
- **Fan-Coil Type:** Fan-coil control by On/Off or PI control.

## Fan-Coil On/Off Control

- **Fan-Coil Speed Output objects:** Sets the speed control of the Fan-coil, independently or cumulatively way. The object number is the same in both cases.

Fan-Coil Speed Output objects	<input checked="" type="radio"/> Only one active each Speed <input type="radio"/> Active in accumulative way
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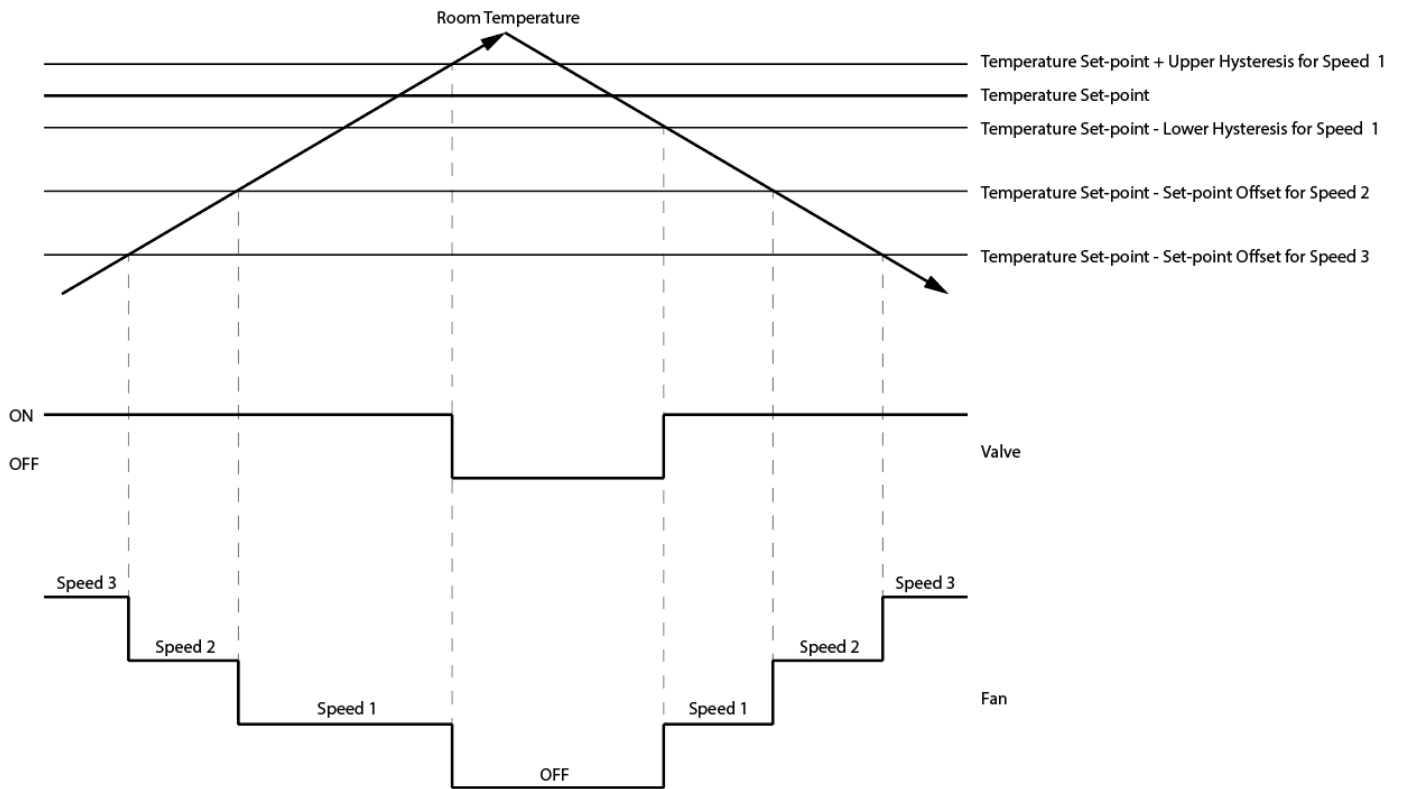
- **Valve independent control:** In the On / Off Control mode of the Fan-Coil it is possible to have the possibility of opening or closing the Valve independently of the Fan. In this way, the Valve can be kept open, when the real temperature is close to the setpoint, without the need of being the Fan On and avoiding unnecessary noise.

- **If it is NOT done an independent control of the Valve and it is a 2-pipe system:**

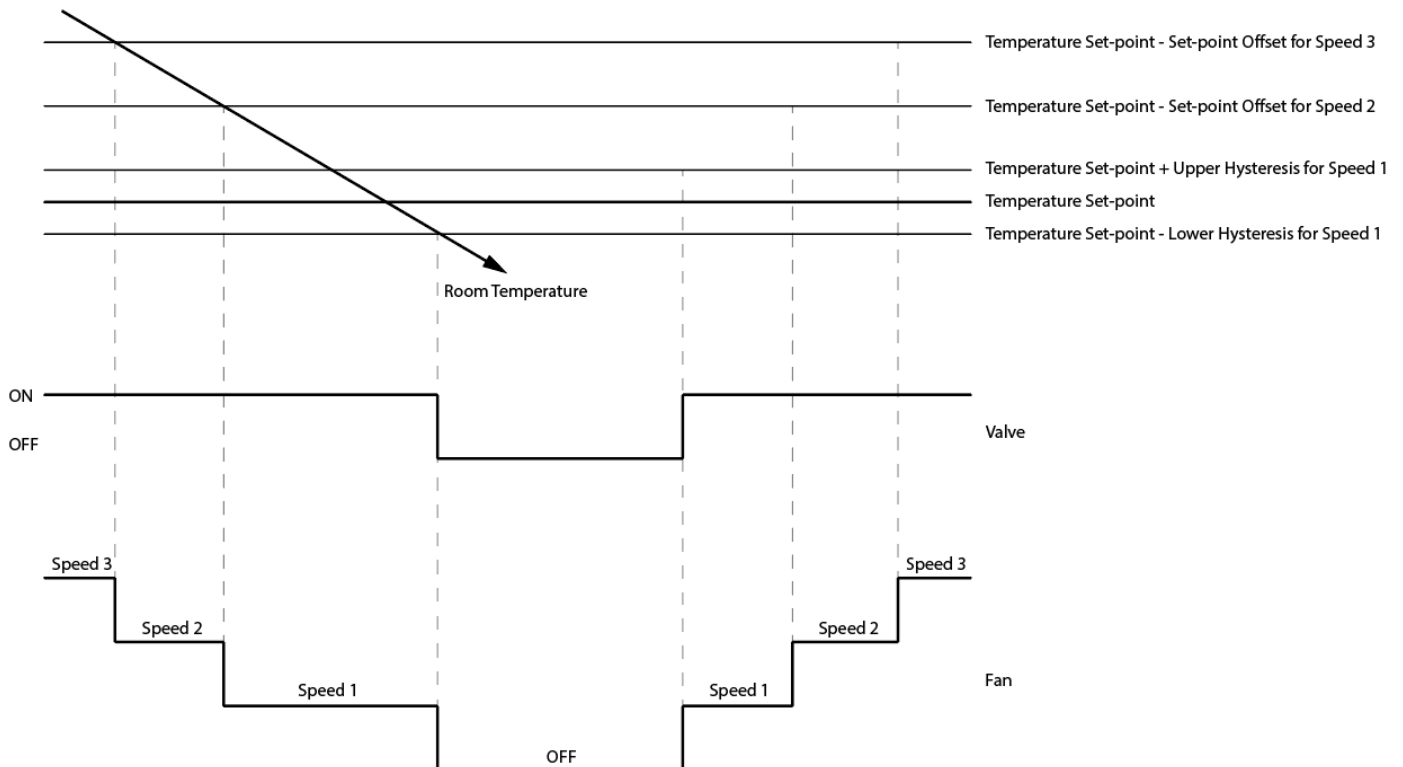
Heat / Cool System	<input checked="" type="radio"/> 2 pipes <input type="radio"/> 4 pipes
Fan-Coil Type	<input checked="" type="radio"/> Control On/Off <input type="radio"/> PI Control
Fan-Coil Speed Output objects	<input checked="" type="radio"/> Only one active each Speed <input type="radio"/> Active in accumulative way
Valve independent control	<input type="checkbox"/>
<hr/>	
HEATING	
Forwarding period (0=Disable)	0 [x 1 min]
FAN SPEED SETTINGS Heating	
Upper Hysteresis to activate Speed 1	10 [x 0,1°C]
Lower Hysteresis to activate Speed 1	10 [x 0,1°C]
Offset from Set-point to activate Speed 2	-30 [x 0,1°C]
Offset from Set-point to activate Speed 3	-50 [x 0,1°C]
<hr/>	
COOLING	
Forwarding period (0=Disable)	0 [x 1 min]
FAN SPEED SETTINGS Cooling	
Upper Hysteresis to activate Speed 1	10 [x 0,1°C]
Lower Hysteresis to activate Speed 1	10 [x 0,1°C]
Offset from Set-point to activate Speed 2	30 [x 0,1°C]
Offset from Set-point to activate Speed 3	50 [x 0,1°C]

- **Forwarding period (0=Disable):** How often is the Fan Speed and Valve status sent.

## HEATING – FAN SPEED SETTING



## COOLING – FAN SPEED SETTING

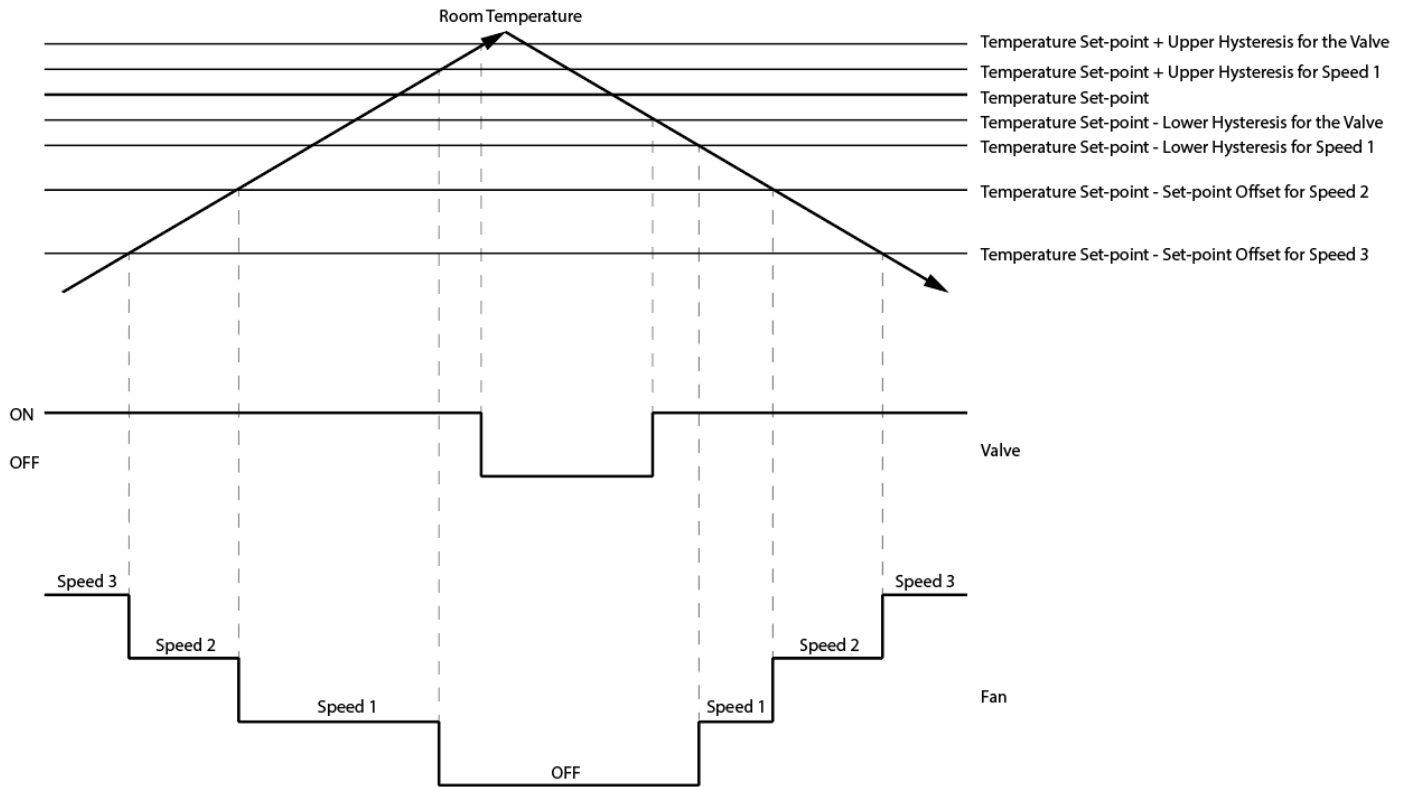


- If it is done an independent control of the Valve and it is a 2-pipe system:

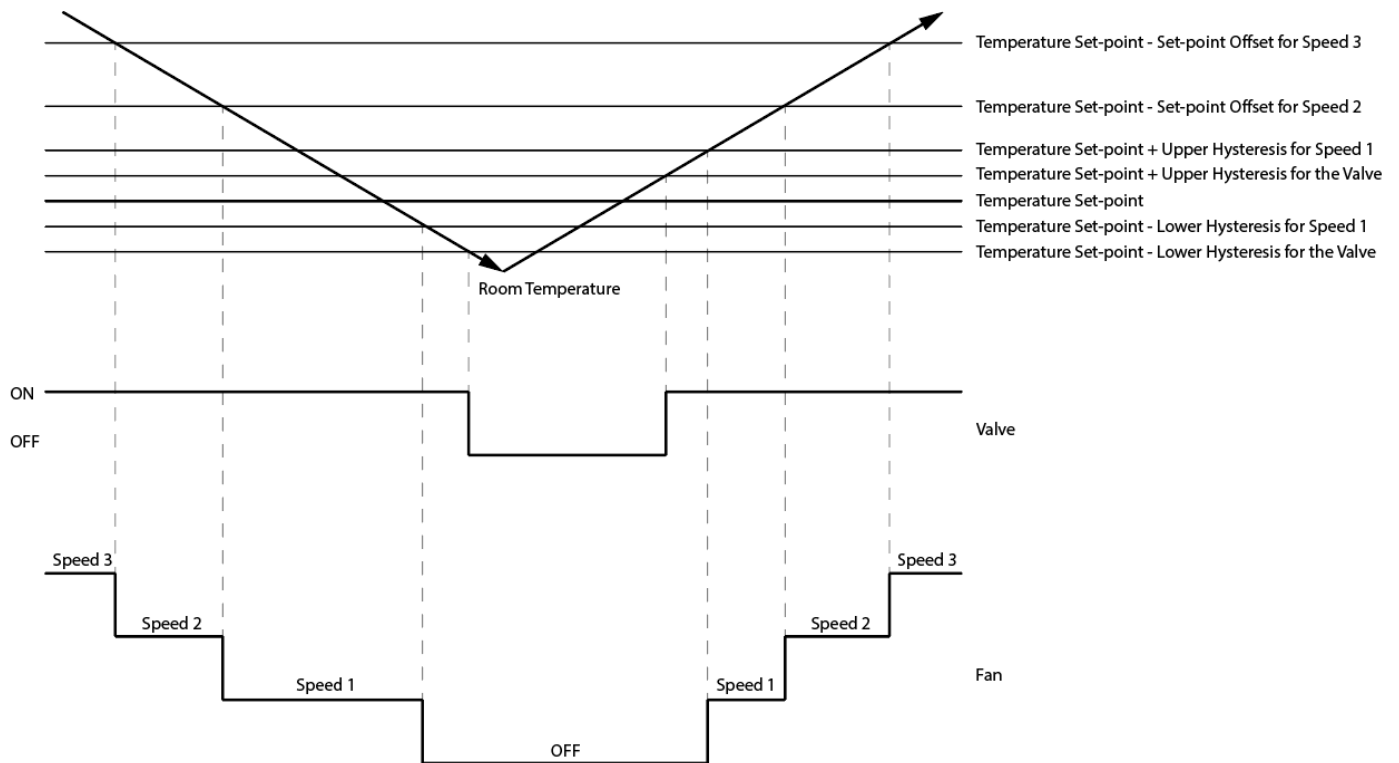
Heat / Cool System	<input checked="" type="radio"/> 2 pipes	<input type="radio"/> 4 pipes
Fan-Coil Type	<input checked="" type="radio"/> Control On/Off	<input type="radio"/> PI Control
Fan-Coil Speed Output objects	<input checked="" type="radio"/> Only one active each Speed	<input type="radio"/> Active in accumulative way
Valve independent control	<input checked="" type="checkbox"/>	
Valve Control type	<input checked="" type="radio"/> Control On/Off	<input type="radio"/> PI Control
<hr/>		
HEATING		
Forwarding period (0=Disable)	<input type="text" value="0"/>	[x 1 min]
FAN SPEED SETTINGS Heating		
Upper Hysteresis to activate Speed 1	<input type="text" value="10"/>	[x 0,1°C]
Lower Hysteresis to activate Speed 1	<input type="text" value="10"/>	[x 0,1°C]
Offset from Set-point to activate Speed 2	<input type="text" value="-30"/>	[x 0,1°C]
Offset from Set-point to activate Speed 3	<input type="text" value="-50"/>	[x 0,1°C]
VALVE SETTINGS Heating		
Upper Hysteresis for Valve	<input type="text" value="10"/>	[x 0,1°C]
Lower Hysteresis for Valve	<input type="text" value="10"/>	[x 0,1°C]
<hr/>		
COOLING		
Forwarding period (0=Disable)	<input type="text" value="0"/>	[x 1 min]
FAN SPEED SETTINGS Cooling		
Upper Hysteresis to activate Speed 1	<input type="text" value="10"/>	[x 0,1°C]
Lower Hysteresis to activate Speed 1	<input type="text" value="10"/>	[x 0,1°C]
Offset from Set-point to activate Speed 2	<input type="text" value="30"/>	[x 0,1°C]
Offset from Set-point to activate Speed 3	<input type="text" value="50"/>	[x 0,1°C]
VALVE SETTINGS Cooling		
Upper Hysteresis for Valve	<input type="text" value="10"/>	[x 0,1°C]
Lower Hysteresis for Valve	<input type="text" value="10"/>	[x 0,1°C]

- **Forwarding period (0=Disable):** How often is the Fan Speed and Valve status sent.

## HEATING – FAN SPEED SETTING



## COOLING – FAN SPEED SETTING



- **4 pipes System:** The operation is similar to the control of a 2-pipe system, but in this case, there are 2 independent Valves, one for the control of Heating, and another for Cooling.



### **Fan-Coil and Valve PI Control**

The logic and parameters are similar to the used in the On/Off Control, but in this case, a I-Byte object is available to carry out the control.

In this type of control, for both the Valve and the Fan, it is necessary to set several parameters:

- **PI Cycle Time:** this time is considered for setting the temperature sampling frequency and therefore the update frequency of the control signal. High values should be selected for systems with high thermal inertia (~ 20min) and lower values for systems with lower thermal inertia (~10min).
- **Proportional Band:** resulting value between the setpoint temperature and the actual temperature from which the proportional integral value will be applied.
  - If the difference between the actual temperature and the setpoint temperature is **higher** than the parameter "Proportional band", the Fan-coil output will be 100%.
  - If the difference between the actual temperature and the setpoint temperature is **lower** than the parameter "Proportional band", the Fan-coil output will be the result of the addition of two values:
    - Proportional value: The Proportional value (rule of three) between the difference "Setpoint temperature" - "Actual temperature" in the case of heating thermostat, or "Actual temperature" - "Setpoint temperature" in the case of cooling, with respect to the parameter "Proportional band".
    - Integral value: This value is the result of adding the difference between the "Actual Temperature" and the "Setpoint temperature" in each integration cycle. The "Attenuation Factor" is applied to this sum and the resulting value is added to the "Proportional Value" if it is less than the "Maximum Integral Component" value. Otherwise, the value "Maximum Integral Component" is added.

The result can never be higher than 100%.

- **Attenuation factor:** attenuation that is applied to the Integral value before adding it to the Proportional value.
- **Maximum Integral component (%):** Integral value limitation

## Humidity Sensor:

An internal Relative Humidity Sensor is available:

+ Device Configuration	Enable Humidity Sensor	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
+ Configurable Buttons	Humidity Sensor calibration sign	<input checked="" type="radio"/> Negative <input type="radio"/> Positive
+ Internal Temperature Sensor	Humidity Sensor calibration value	0 %
+ Thermostat	"Humidity Sensor" enabled after recovering bus voltage	<input checked="" type="checkbox"/>
- Humidity Sensor	Base time to send Humidity	1 min
	Factor (Total time = Base x Factor)	1 (0=Disable)
<b>Configuration</b>	Humidity variation for sending value (0 = Not send)	0 %
+ Brightness Sensor	Protection Alarms	No protection
+ Twilight Function		
+ Inputs		

- **Enable Humidity Sensor:** Allows enabling the functionality of the internal Humidity sensor. However, the object “[Hum] Disable Humidity Sensor” will be available and it will allow enabling (0) or not (1) this sensor.
- **Humidity Sensor calibration Sign / Value:** Defines an offset to be applied to the measurement received from the sensor to correct possible deviations.
- **“Humidity Sensor” enabled after recovering bus voltage:** Sets whether the Humidity sensor will be enabled after the start-up. If this parameter is not enabled, the Humidity functionality would be disabled after a power failure.
- **Base time to send Humidity:** Sets every how much time the object “[Hum] Humidity Value” will be sent to the bus.
- **Humidity variation for sending value:** Defines a threshold so that if a new reading of the current humidity is found to differ from the last value sent to the bus higher than such threshold, a new sending will take place and the sending period will be restarted. The value “0” disables this sending.
- **Protection Alarms:**

Protection Alarms	<input type="text" value="No protection"/> <ul style="list-style-type: none"> <li><input type="text" value="No protection"/> <input checked="" type="checkbox"/></li> <li><input type="text" value="High Humidity Alarm"/></li> <li><input type="text" value="Low Humidity Alarm"/></li> <li><input type="text" value="High and Low Humidity Alarms"/></li> </ul>
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- **High Humidity Alarm:** Maximum Humidity permitted. Humidity values greater than this will be considered over-humidity, and therefore a “1” will be periodically sent through object “[Hum] High Humidity Alarm”.
- **Low Humidity Alarm:** Minimum Humidity permitted. Humidity values lower than this will be considered under-humidity, and therefore a “1” will be periodically sent through object “[Hum] Low Humidity Alarm”.
- **Hysteresis:** Threshold around the over- and under-humidity defined above. This dead band prevents the device from sending the over- and under-humidity alarm and no-alarm over and over when the current humidity keeps fluctuating around the limit.

## Brightness Sensor:

An internal Brightness Sensor is also available.

+ Device Configuration	Enable Brightness Sensor	<input checked="" type="checkbox"/>
+ Configurable Buttons	Time base for cyclic transmission	10 sec
+ Internal Temperature Sensor	Factor (Total time = Base x Factor)	1 (0=Disable)
+ Thermostat	Activate object "Brightnesst Sensor Disable"	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
+ Humidity Sensor		
- Brightness Sensor		
<b>Configuration</b>		
+ Twilight Function		
+ Inputs		

- **Enable Brightness Sensor:** Allows enabling the functionality of the internal Brightness sensor.
- **Time base for cyclic transmission:** Sets every how much time the object “[Lux] Brightness Value” will be sent to the bus.
- **Activate object “Brightness Sensor Disable”:** The object “[Lux] Enable Brightness Sensor” will be available to enable (0) or not (1) the functionality of this sensor.

Activate object "Brightnesst Sensor Disable"	<input checked="" type="radio"/> Enable	<input type="radio"/> Disable
Enable Brightness Sensor with	<input type="radio"/> ON Telegram	<input checked="" type="radio"/> OFF Telegram
Behaviour after recovering bus voltage		
Object "Enable Brightness Sensor" state	<input type="radio"/> Enable	<input checked="" type="radio"/> Disable

- **Enable Brightness Sensor with:** Sets the polarity of the object “[Lux] Enable Brightness Sensor”.
- **Object “Enable Brightness Sensor” state:** Sets whether the Brightness sensor will be enabled after the start-up. If this parameter is not enabled, the Brightness functionality would be disabled after a power failure.

## Twilight Function:

It is possible to enable a Twilight Function associated with the Brightness measured by its internal sensor.

+ Device Configuration	Twilight Function	<input checked="" type="checkbox"/>
+ Configurable Buttons	Type of Twilight object	<input type="radio"/> Switching <input checked="" type="radio"/> Value
+ Internal Temperature Sensor	Sending at Upper Threshold	99
+ Thermostat	Sending at Lower Threshold	0
+ Humidity Sensor	Time base for cyclic transmission	10 sec
+ Brightness Sensor	Factor (Total time = Base x Factor)	1
- Twilight Function	Upper Threshold (Lux)	50
	(Upper higher than Lower)	
	Lower Threshold (Lux)	16
	Activate object "Enable Twilight Function"	<input type="checkbox"/>
	<b>Configuration</b>	
+ Inputs		

- **Twilight Function:** Allows enabling the Twilight functionality. However, the object “[Twil] Enable Twilight Function” will be available and it will allow enabling (0) or not (1) this functionality.
- **Type of Twilight object:** Defines the value type will be sent via the output object “[Twil] Twilight Function”.
- **Sending at Upper Threshold:** Sets the value which will be sent when the Upper Threshold is reached.
- **Sending at Lower Threshold:** Sets the value which will be sent when the Lower Threshold is reached.
- **Time base for cyclic transmission:** Determines every how much time the object “[Twil] Twilight Function” will be sent to the bus.
- **Upper Threshold (Lux):** Upper Lux threshold value.
- **Lower Threshold (Lux):** Lower Lux threshold value.
- **Activate object “Enable Twilight Function”:** The object “[Twil] Enable Twilight Function” will be available to enable (0) or not (1) this functionality.

Activate object "Enable Twilight Function"	<input checked="" type="checkbox"/>
Enable Twilight Function with	<input type="radio"/> ON Telegram <input checked="" type="radio"/> OFF Telegram
Behaviour after recovering bus voltage	
Object "Enable Twilight Function" state	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

- **Enable Twilight Function with:** Sets the polarity of the object “[Twil] Enable Twilight Function”.
- **Object “Enable Twilight Function” state:** Sets whether the Twilight function sensor will be enabled after the start-up. If this parameter is not enabled, the Twilight functionality would be disabled after a power failure.

## Inputs:

Four Inputs are available in the back side of the Thermostat.

They can be enabled to manage the connection of a Door/Window Contact reed or a DINUY Temperature Probe (ST KNT 001 or ST KNT 002).

The screenshot shows a configuration menu with the following items:

- + Device Configuration
- + Configurable Buttons
- + Internal Temperature Sensor
- + Thermostat
- + Humidity Sensor
- + Brightness Sensor
- + Twilight Function
- Inputs
  - Input 1 (selected)
  - Input 2
  - Input 3
  - Input 4

The 'Input Functionality' dropdown menu is open, showing the following options:

- Not assigned
- Door/Window Contact
- Temperature Sensor
- Not assigned (checked)

- **Door/Window Contact Functionality:** Up to 4 free-voltage Door/Window Contacts can be connected to the inputs.

The configuration panel for 'Input Functionality' includes the following settings:

- Input Functionality: Door/Window Contact
- Window Contact polarity:  Not inverted  Inverted
- Functionality enabled after recovering bus voltage:
- Base time to refresh value: 1 min
- Factor (Total time = Base x Factor) (0 = no refresh): 1

- **Window Contact polarity:** Sets if it is a normally closed or normally open contact.
- **Functionality enabled after recovering bus voltage:** The input can be automatically enabled after recovering bus voltage. In the event that this parameter is not enabled, the functionality should be enabled via the object “[InX] Disable Input” after the voltage is restored.
- **Base time to refresh value:** Sets every how much time the “[InX] Window state” object would be sent to the bus. The value “0” leaves this periodical sending disabled.

- **Temperature Sensor Functionality:** Up to 4 DINUY Temperature Probes (ST KNT 001 or ST KNT 002) can be connected to the inputs. In this way, the measured temperature can be used as a second source in the Thermostat function.

Input Functionality	Temperature Sensor
Functionality enabled after recovering bus voltage	<input checked="" type="checkbox"/>
Base time to refresh value	1 min
Factor (Total time = Base x Factor) (0 = no refresh)	1
Temperature Sensor calibration value	0 [x 0,1°C]
Temperature variation for sending value	5 x 0,1°C (0=Disable)
Protection Alarms	No protection

- **Functionality enabled after recovering bus voltage:** The input can be automatically enabled after recovering bus voltage. In the event that this parameter is not enabled, the functionality should be enabled via the object “[InX] Disable Input” after the voltage is restored.
- **Base time to refresh value:** Sets every how much time the “[InX] Sensor Temperature Value” object would be sent to the bus. The value “0” leaves this periodical sending disabled.
- **Temperature Sensor calibration value:** Defines an offset to be applied to the measurement received from the sensor to correct possible deviations.
- **Temperature variation for sending value:** Defines a threshold so that if a new reading of the current temperature is found to differ from the last value sent to the bus higher than such threshold, a new sending will take place and the sending period will be restarted. The value “0” disables this sending.
- **Protection Alarms:**

Protection Alarms	Over-Heating and Over-Cooling
Over-Heating Temperature	35 [x 1°C]
Over-Cooling Temperature	10 [x 1°C]
Hysteresis	0 [x 0,1°C]

- **Over-Heating Temperature:** Maximum Temperature permitted. Temperature values greater than this will be considered over-heating, and therefore a “I” will be periodically sent through object “[InX] Temperature Sensor Over-Heating”.
- **Over-Cooling Temperature:** Minimum Temperature permitted. Temperature values lower than this will be considered over-cooling, and therefore a “I” will be periodically sent through object “[InX] Temperature Sensor Over-Cooling”.
- **Hysteresis:** Threshold around the over-heating and over-cooling defined above. This dead band prevents the device from sending the over-heating and over-cooling alarm and no-alarm over and over when the current temperature keeps fluctuating around the limit.

## Communication Objects

### Configurable Buttons Objects

#### Switch:

	Number ^	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
↔	24	[PB1] Disable Button	1 = Disable, 0 = Enable	1 bit	C	-	W	-	-	enable	Low
↔	25	[PB1] Short Press: Switch	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
↔	26	[PB1] Long Press: Switch	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
↔	29	[PB1] LED "Button 1"	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
↔	30	[PB2] Disable Button	1 = Disable, 0 = Enable	1 bit	C	-	W	-	-	enable	Low
↔	31	[PB2] Short Press: Switch	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
↔	32	[PB2] Long Press: Switch	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
↔	35	[PB2] LED "Button 2"	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low

Number	Name	Function	Description
24, 30	[PB1..2] Disable Button	1 = Disable; 0 = Enable	Allows disabling the functionality of the button 1 or 2
25, 31	[PB1..2] Short Press: Switch	1 = On; 0 = Off	Output Switch object after a short press
26, 32	[PB1..2] Long Press: Switch	1 = On; 0 = Off	Output Switch object after a long press
29, 35	[PB1..2] LED "Button 1..2"	0 = Off; 1 = On	Input object for the control of each LED

**Dimmer:**

	Number ^	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
■↔	24	[PB1] Disable Button	1 = Disable, 0 = Enable	1 bit	C	-	W	-	-	enable	Low
■↔	25	[PB1] Press	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
■↔	26	[PB1] Long Press: Dimming	Dimming control	4 bit	C	R	-	T	-	dimming control	Low
■↔	29	[PB1] LED "Button 1"	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
■↔	30	[PB2] Disable Button	1 = Disable, 0 = Enable	1 bit	C	-	W	-	-	enable	Low
■↔	31	[PB2] Press	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
■↔	32	[PB2] Long Press: Dimming	Dimming control	4 bit	C	R	-	T	-	dimming control	Low
■↔	35	[PB2] LED "Button 2"	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low

Number	Name	Function	Description
24, 30	[PB1..2] Disable Button	1 = Disable; 0 = Enable	Allows disabling the functionality of the button 1 or 2
25, 31	[PB1..2] Press	1 = On; 0 = Off	Output Switch object after a short press
26, 32	[PB1..2] Long Press: Dimming	Dimming control	Output Dimming object after a long press
29, 35	[PB1..2] LED "Button 1..2"	0 = Off; 1 = On	Input object for the control of each LED



### Multiple Switch:

	Number ^	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
➡	24	[PB1] Disable Button	1 = Disable, 0 = Enable	1 bit	C	-	W	-	-	enable	Low
➡	25	[PB1] Press	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
➡	26	[PB1] Press 2	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
➡	27	[PB1] Press 3	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
➡	28	[PB1] Press 4	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
➡	29	[PB1] LED "Button 1"	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
➡	30	[PB2] Disable Button	1 = Disable, 0 = Enable	1 bit	C	-	W	-	-	enable	Low
➡	31	[PB2] Press	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
➡	32	[PB2] Press 2	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
➡	33	[PB2] Press 3	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
➡	34	[PB2] Press 4	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
➡	35	[PB2] LED "Button 2"	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low

Number	Name	Function	Description
24, 30	[PB1..2] Disable Button	1 = Disable; 0 = Enable	Allows disabling the functionality of the button 1 or 2
25, 26, 27, 28, 31, 32, 33, 34	[PB1..2] Press 1..4	1 = On; 0 = Off	Output object to switch on or off after a press and taking into account the sequence
29, 35	[PB1..2] LED "Button 1..2"	0 = Off; 1 = On	Input object for the control of each LED

**Shutter / Blind:**

	Number ^	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
↔	24	[PB1] Disable Button	1 = Disable, 0 = Enable	1 bit	C	-	W	-	-	enable	Low
↔	25	[PB1] Short Press: Blind Step/Stop	0 = Step Up / Stop, 1 = Step Down / Stop	1 bit	C	R	-	T	-	step	Low
↔	26	[PB1] Long Press: Move Blind	0 = Up, 1 = Down	1 bit	C	R	-	T	-	up/down	Low
↔	29	[PB1] LED "Button 1"	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
↔	30	[PB2] Disable Button	1 = Disable, 0 = Enable	1 bit	C	-	W	-	-	enable	Low
↔	31	[PB2] Short Press: Blind Step/Stop	0 = Step Up / Stop, 1 = Step Down / Stop	1 bit	C	R	-	T	-	step	Low
↔	32	[PB2] Long Press: Move Blind	0 = Up, 1 = Down	1 bit	C	R	-	T	-	up/down	Low
↔	35	[PB2] LED "Button 2"	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low

Number	Name	Function	Description
24, 30	[PB1..2] Disable Button	I = Disable; 0 = Enable	Allows disabling the functionality of the button 1 or 2
25, 31	[PB1..2] Short Press: Blind Step/Stop	0 = Step Up / Stop; 1 = Step Down / Stop	Output object to carry out a step up or down, or stop, on the blind / shutter after a short press
26, 32	[PB1..2] Long Press: Move Blind	0 = Up; 1 = Down	Output object to carry out a move up or down on the blind / shutter after a long press
29, 35	[PB1..2] LED "Button 1..2"	0 = Off; 1 = On	Input object for the control of each LED

### Scene Control:

	Number ^	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
↔	24	[PB1] Disable Button	1 = Disable, 0 = Enable	1 bit	C	-	W	-	-	enable	Low
↔	25	[PB1] Short Press: Send Scene	8-bit Scene Control	1 byte	C	R	-	T	-	scene control	Low
↔	26	[PB1] Long Press: Save Scene	0 = No action, 1 = Save Scene	1 bit	C	-	W	-	-	enable	Low
↔	29	[PB1] LED "Button 1"	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
↔	30	[PB2] Disable Button	1 = Disable, 0 = Enable	1 bit	C	-	W	-	-	enable	Low
↔	31	[PB2] Short Press: Send Scene	8-bit Scene Control	1 byte	C	R	-	T	-	scene control	Low
↔	32	[PB2] Long Press: Save Scene	0 = No action, 1 = Save Scene	1 bit	C	-	W	-	-	enable	Low
↔	35	[PB2] LED "Button 2"	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low

Number	Name	Function	Description
24, 30	[PB1..2] Disable Button	1 = Disable; 0 = Enable	Allows disabling the functionality of the button 1 or 2
25, 31	[PB1..2] Short Press: Send Scene	8-Bit Scene Control 0 = Scene 1; 1 = Scene 2	Output object to activate a Scene after a short press
26, 32	[PB1..2] Long Press: Save Scene	0 = No action; 1 = Save Scene 0 = Save Scene 1; 1 = Save Scene 2	Output object to save a Scene after a long press
29, 35	[PB1..2] LED "Button 1..2"	0 = Off; 1 = On	Input object for the control of each LED

**Fixed / Forced Value:**

	Number ^	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
↕	24	[PB1] Disable Button	1 = Disable, 0 = Enable	1 bit	C	-	W	-	-	enable	Low
↕	25	[PB1] Short Press: 1-Bit value	1-Bit value sending	1 bit	C	R	-	T	-	state	Low
↕	26	[PB1] Long Press: 1-Bit value	1-Bit value sending	1 bit	C	R	-	T	-	state	Low
↕	29	[PB1] LED "Button 1"	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
↕	30	[PB2] Disable Button	1 = Disable, 0 = Enable	1 bit	C	-	W	-	-	enable	Low
↕	31	[PB2] Short Press: 1-Bit value	1-Bit value sending	1 bit	C	R	-	T	-	state	Low
↕	32	[PB2] Long Press: 1-Bit value	1-Bit value sending	1 bit	C	R	-	T	-	state	Low
↕	35	[PB2] LED "Button 2"	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low

Number	Name	Function	Description
24, 30	[PBI..2] Disable Button	I = Disable; 0 = Enable	Allows disabling the functionality of the button 1 or 2
25, 31	[PBI..2] Pulsación Corta: Valor 1 Bit / 2 Bits / 1 Byte / 2 Bytes con signo / 2 Bytes flotante / 4 Bytes	Envío Valor 1 Bit / 2 Bits / 1 Byte / 2 Bytes con signo / 2 Bytes / 2 Bytes flotante / 4 Bytes	Output object to send a set value after a short press
26, 32	[PBI..2] Pulsación Larga: Valor 1 Bit / 2 Bits / 1 Byte / 2 Bytes con signo / 2 Bytes flotante / 4 Bytes	Envío Valor 1 Bit / 2 Bits / 1 Byte / 2 Bytes con signo / 2 Bytes / 2 Bytes flotante / 4 Bytes	Output object to send a set value after a long press
29, 35	[PBI..2] LED "Button 1..2"	0 = Off; 1 = On	Input object for the control of each LED

## Internal Temperature Sensor Objects

	Number ^	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
■↔	48	[Temp] Disable Temperature Sensor	1 = Disable; 0 = Enable	1 bit	C	-	W	-	-	enable	Low
■↔	49	[Temp] Temperature Value	Temperature Value	2 bytes	C	R	-	T	-	temperature (°C)	Low
■↔	50	[Temp] Temperature Sensor Over-Heating	1 = Over-Heating; 0 = No Over-Heating	1 bit	C	R	-	T	-	alarm	Low
■↔	51	[Temp] Temperature Sensor Over-Cooling	1 = Over-Cooling; 0 = No Over-Cooling	1 bit	C	R	-	T	-	alarm	Low

Number	Name	Function	Description
48	[Temp] Disable Temperature Sensor	1 = Disable; 0 = Enable	Allows disabling the functionality of the internal temperature sensor
49	[Temp] Temperature Value	Temperature Value	2-Byte measured temperatura object
50	[Temp] Temperature Sensor Over-Heating	1 = Over-Heating; 0 = No Over-Heating	Alarm over-heating output object
51	[Temp] Temperature Sensor Over-Cooling	1 = Over-Cooling; 0 = No Over-Cooling	Alarm over-cooling output object

## Thermostat Objects

### TM KNT 002 (with HVAC Special Modes):

	Number ^	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
■↕	52	[Th] On/Off Feedback	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
■↕	53	[Th] On/Off	1 = On; 0 = Off	1 bit	C	-	W	-	-	switch	Low
■↕	54	[Th] Set-point Feedback	Current Set-point	2 bytes	C	R	-	T	-	temperature (°C)	Low
■↕	55	[Th] Set-point Input	Set-point	2 bytes	C	-	W	-	-	temperature (°C)	Low
■↕	56	[Th] Heating Output	Output (2-point with Hysteresis)	1 bit	C	R	-	T	-	switch	Low
■↕	57	[Th] Cooling Output	Output (2-point with Hysteresis)	1 bit	C	R	-	T	-	switch	Low
■↕	58	[Th] Temperature Sensor 1	Input Temperature Sensor 1	2 bytes	C	-	W	-	-	temperature (°C)	Low
■↕	59	[Th] Temperature Sensor 2	Input Temperature Sensor 2	2 bytes	C	-	W	-	-	temperature (°C)	Low
■↕	60	[Th] Special Mode Feedback	2 Bytes Mode Feedback	2 bytes	C	R	-	T	-	RHCC status	Low
■↕	61	[Th] Special mode Input 1 Byte	HVAC 1 Byte mode	1 byte	C	-	W	-	-	HVAC mode	Low
■↕	62	[Th] Special mode Economy	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
■↕	63	[Th] Special mode Stand-by	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
■↕	64	[Th] Special mode Protection	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
■↕	65	[Th] Special mode Comfort	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
■↕	66	[Th] Heating or Cooling mode Feedback	0 = Cooling; 1 = Heating	1 bit	C	R	-	T	-	cooling/heating	Low
■↕	67	[Th] Heating or Cooling mode	0 = Cooling; 1 = Heating	1 bit	C	-	W	-	-	cooling/heating	Low
■↕	68	[Th] Window Alarm 1	0 = No alarm; 1 = Alarm	1 bit	C	-	W	-	-	alarm	Low
■↕	69	[Th] Window Alarm 2	0 = No alarm; 1 = Alarm	1 bit	C	-	W	-	-	alarm	Low
■↕	70	[Th] Window Alarm 3	0 = No alarm; 1 = Alarm	1 bit	C	-	W	-	-	alarm	Low
■↕	71	[Th] Window Alarm 4	0 = No alarm; 1 = Alarm	1 bit	C	-	W	-	-	switch	Low

Number	Name	Function	Description
52	[Th] On/Off Feedback	1 = On; 0 = Off	If the Thermostat is not always on (set by parameter), this 1-Bit object allows knowing its state
53	[Th] On/Off	1 = On; 0 = Off	If the Thermostat is not always on (set by parameter), this 1-Bit object allows switching it on/off
54	[Th] Set-point Feedback	Current set-point	Fixed temperature set-point
55	[Th] Set-point Input [Th] Comfort Set-point Input	Set-point Comfort set-point	Set-point input object. If "Relative Set-point Mode" is selected, this value will be the Comfort Mode Set-point
56	[Th] Heating Output	Output (2-point with Hysteresis) Output (% Proportional - Integral) Output (PWM Proportional - Integral)	Output object for Valve control. It can be a 1-Bit or 1-Byte value, depending on whether the control is done by PWM or by percentages
57	[Th] Cooling Output	Output (2-point with Hysteresis) Output (% Proportional - Integral) Output (PWM Proportional - Integral)	Output object for Valve control. It can be a 1-Bit or 1-Byte value, depending on whether the control is done by PWM or by percentages
58	[Th] Temperature Sensor 1	Input Temperature Sensor 1	Input temperature value from a sensor
59	[Th] Temperature Sensor 2	Input Temperature Sensor 2	Input temperature value from a sensor
60	[Th] Special Mode Feedback	2 Bytes Mode Feedback	Information about the Special state of the Thermostat
61	[Th] Special mode Input 1 Byte	HVAC 1 Byte Mode	1-Byte input object to select a Special mode
62	[Th] Special mode Economy	0 = Off; 1 = On	1-Bit input object to activate a Special mode
63	[Th] Special mode Stand-by	0 = Off; 1 = On	
64	[Th] Special mode Protection	0 = Off; 1 = On	

65	[Th] Special mode Comfort	0 = Off; 1 = On	
66	[Th] Heating or Cooling mode Feedback	0 = Cooling; 1 = Heating	Information about the state of the Thermostat: Heating or Cooling
67	[Th] Heating or Cooling mode	0 = Cooling; 1 = Heating	Allows activating the Heating or Cooling mode manually. This object will be available as long as automatic mode change is not selected by parameter
68	[Th] Window Alarm 1	0 = No Alarm; 1 = Alarm	1-Bit Alarm Object. Allows controlling the opening of a window. It is a protection in a preferential way to the rest of the modes, so no other special mode can be activated until the window status becomes "0"
69	[Th] Window Alarm 2	0 = No Alarm; 1 = Alarm	
70	[Th] Window Alarm 3	0 = No Alarm; 1 = Alarm	
71	[Th] Window Alarm 4	0 = No Alarm; 1 = Alarm	



## Thermostat Objects

### TM KNT 001 (with Fan-coil Speed):

	Number ^	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
↔	37	[Fancoil] Fan On (Auto) / Off	1 = On; 0 = Off	1 bit	C	-	W	-	-	switch	Low
↔	38	[Fancoil] Set Speed 1	1 = On;	1 bit	C	-	W	-	-	switch	Low
↔	39	[Fancoil] Set Speed 2	1 = On;	1 bit	C	-	W	-	-	switch	Low
↔	40	[Fancoil] Set Speed 3	1 = On;	1 bit	C	-	W	-	-	switch	Low
↔	41	[Fancoil] Speed 1 Output	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
↔	42	[Fancoil] Speed 2 Output	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
↔	43	[Fancoil] Speed 3 Output	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
↔	52	[Th] On/Off Feedback	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
↔	53	[Th] On/Off	1 = On; 0 = Off	1 bit	C	-	W	-	-	switch	Low
↔	54	[Th] Set-point Feedback	Current Set-point	2 bytes	C	R	-	T	-	temperature (°C)	Low
↔	55	[Th] Set-point Input	Set-point	2 bytes	C	-	W	-	-	temperature (°C)	Low
↔	56	[Fancoil] Heating Valve Output	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
↔	57	[Fancoil] Cooling Valve Output	1 = On; 0 = Off	1 bit	C	R	-	T	-	switch	Low
↔	58	[Th] Temperature Sensor 1	Input Temperature Sensor 1	2 bytes	C	-	W	-	-	temperature (°C)	Low
↔	59	[Th] Temperature Sensor 2	Input Temperature Sensor 2	2 bytes	C	-	W	-	-	temperature (°C)	Low
↔	60	[Th] Special Mode Feedback	2 Bytes Mode Feedback	2 bytes	C	R	-	T	-	RHCC status	Low
↔	61	[Th] Special mode Input 1 Byte	HVAC 1 Byte mode	1 byte	C	-	W	-	-	HVAC mode	Low
↔	62	[Th] Special mode Economy	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
↔	63	[Th] Special mode Stand-by	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
↔	64	[Th] Special mode Protection	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
↔	65	[Th] Special mode Comfort	0 = Off; 1 = On	1 bit	C	-	W	-	-	switch	Low
↔	66	[Th] Heating or Cooling mode Feedback	0 = Cooling; 1 = Heating	1 bit	C	R	-	T	-	cooling/heating	Low
↔	67	[Th] Heating or Cooling mode	0 = Cooling; 1 = Heating	1 bit	C	-	W	-	-	cooling/heating	Low
↔	68	[Th] Window Alarm 1	0 = No alarm; 1 = Alarm	1 bit	C	-	W	-	-	alarm	Low
↔	69	[Th] Window Alarm 2	0 = No alarm; 1 = Alarm	1 bit	C	-	W	-	-	alarm	Low
↔	70	[Th] Window Alarm 3	0 = No alarm; 1 = Alarm	1 bit	C	-	W	-	-	alarm	Low
↔	71	[Th] Window Alarm 4	0 = No alarm; 1 = Alarm	1 bit	C	-	W	-	-	switch	Low

Number	Name	Function	Description
37	[Fancoil] Fan On (Auto) / Off	I = On; 0 = Off	Output object which controls the Fan speed. If a "1" is sent, the Fan will be switched-on in Automatic Speed.
38	[Fancoil] Set Speed 1	I = On; 0 = Off	Input object to set Fan Speed 1
39	[Fancoil] Set Speed 2	I = On; 0 = Off	Input object to set Fan Speed 2
40	[Fancoil] Set Speed 3	I = On; 0 = Off	Input object to set Fan Speed 3
41	[Fancoil] Speed 1 Output	I = On; 0 = Off	Information object about Fan Speed 1 state
42	[Fancoil] Speed 2 Output	I = On; 0 = Off	Information object about Fan Speed 2 state
43	[Fancoil] Speed 3 Output	I = On; 0 = Off	Information object about Fan Speed 3 state
52	[Th] On/Off Feedback	I = On; 0 = Off	If do not select the Thermostat is always on by parameter, this I-Bit object will allow knowing the status of the Thermostat
53	[Th] On/Off	I = On; 0 = Off	If do not select the Thermostat is always on by parameter, this I-Bit object will allow switching on/off the Thermostat
54	[Th] Set-point Feedback	Current Set-point	Fixed Temperature Set-point
55	[Th] Set-point Input [Th] Comfort Set-point Input	Set-point Comfort set-point	Set-point input object. If "Relative Set-point Mode" is selected, this value will be the Comfort Set-point
56	[Fancoil] Valve Output [Fancoil] Heating Valve Output	0 – 100% I = On; 0 = Off	Information output object to control the Valve (2-pipe) or the Heating Valve (4-pipe). It can be a value in % (PI control) or I-Bit (On/Off control)
57	[Fancoil] Cooling Valve Output	0 – 100% I = On; 0 = Off	Information output object to control the Cooling Valve (4-pipe). It can be a value in % (PI control) or I-Bit (On/Off control)
58	[Th] Temperature Sensor 1	Input Temperature Sensor 1	Input temperature value from a sensor

59	[Th] Temperature Sensor 2	Input Temperature Sensor 2	Input temperature value from a sensor
60	[Th] Special Mode Feedback	2 Bytes Mode Feedback	Status about the Special mode of the Thermostat
61	[Th] Special mode Input 1 Byte	HVAC 1 Byte mode	Allows selecting a HVAC Special mode
62	[Th] Special mode Economy	0 = Off; 1 = On	I-Bit object to activate a HVAC Special mode
63	[Th] Special mode Stand-by	0 = Off; 1 = On	
64	[Th] Special mode Protection	0 = Off; 1 = On	
65	[Th] Special mode Comfort	0 = Off; 1 = On	
66	[Th] Heating or Cooling mode Feedback	0 = Cooling; 1 = Heating	Information about the status of the Thermostat: Heating or Cooling
67	[Th] Heating or Cooling mode	0 = Cooling; 1 = Heating	Allows activating the Heating or Cooling mode manually. This object will be active if automatic mode change is not selected by parameter
68	[Th] Window Alarm 1	0 = No Alarm; 1 = Alarm	I-Bit Alarm object. It allows you controlling the opening of a window. It is a protection with higher priority than the rest of the modes, so no other special mode can be activated until the window status becomes "0".
69	[Th] Window Alarm 2	0 = No Alarm; 1 = Alarm	
70	[Th] Window Alarm 3	0 = No Alarm; 1 = Alarm	
71	[Th] Window Alarm 4	0 = No Alarm; 1 = Alarm	

## Humidity Sensor Objects

	Number ^	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
↔	44	[Hum] Disable Humidity Sensor	1 = Disable; 0 = Enable	1 bit	C	-	W	-	-	enable	Low
↔	45	[Hum] Humidity Value	Humidity Value	2 bytes	C	R	-	T	-	humidity (%)	Low
↔	46	[Hum] High Humidity Alarm	1 = High Humidity; 0 = No High Humidity	1 bit	C	R	-	T	-	alarm	Low
↔	47	[Hum] Low Humidity Alarm	1 = Low Humidity; 0 = No Low Humidity	1 bit	C	R	-	T	-	alarm	Low

Number	Name	Function	Description
44	[Hum] Disable Humidity Sensor	1 = Disable; 0 = Enable	Allows disabling the functionality of the internal humidity sensor
45	[Hum] Humidity Value	Humidity Value	Output object with the humidity value measured by the internal sensor
46	[Hum] High Humidity Alarm	1 = High Humidity; 0 = No High Humidity	Alarm output object in case of excess humidity according to the set threshold
47	[Hum] Low Humidity Alarm	1 = Low Humidity; 0 = No Low Humidity	Alarm output object in case of too low humidity according to the set threshold

## Brightness Sensor Objects

	Number *	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
↔	74	[Lux] Enable Brightness Sensor	1 = Disable; 0 = Enable	1 bit	C	-	W	-	-	enable	Low
↔	75	[Lux] Brightness Value	Lux value	2 bytes	C	R	-	T	-	lux (Lux)	Low

Number	Name	Function	Description
74	[Lux] Enable Brightness Sensor	1 = Disable; 0 = Enable	Allows disabling the functionality of the internal brightness sensor
75	[Lux] Brightness Value	Lux value	Output object with the brightness value measured by the internal sensor

## Twilight Function Objects

	Number ^	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
↔	72	[Twil] Enable Twilight Function	1 = Disable; 0 = Enable	1 bit	C	-	W	-	-	enable	Low
↔	73	[Twil] Twilight Output	% Value	1 byte	C	R	-	T	-	percentage (0..100%)	Low

Number	Name	Function	Description
72	[Twil] Enable Twilight Function	I = Disable; 0 = Enable	Allows disabling the twilight switch functionality
73	[Twil] Twilight Output	% Value ON - OFF	Output object with the value of I Byte (%) or I Bit of the twilight function

## Input Objects

	Number ^	Name	Object Function	Length	C	R	W	T	U	Data Type	Priority
↔	0	[In1] Disable Input	1 = Disable	1 bit	C	-	W	-	-	enable	Low
↔	1	[In1] Window state	1 = Open, 0 = Closed	1 bit	C	R	-	T	-	open/close	Low
↔	4	[In2] Disable Input	1 = Disable	1 bit	C	-	W	-	-	enable	Low
↔	5	[In2] Sensor Temperature Value	Temperature Value °C	2 bytes	C	R	-	T	-	temperature (°C)	Low
↔	6	[In2] Temperature Sensor Over-Heating	1 = Over-Heating; 0 = No Over-Heating	1 bit	C	R	-	T	-	alarm	Low
↔	7	[In2] Temperature Sensor Over-Cooling	1 = Over-Cooling; 0 = No Over-Cooling	1 bit	C	R	-	T	-	alarm	Low
↔	8	[In3] Disable Input	1 = Disable	1 bit	C	-	W	-	-	enable	Low
↔	9	[In3] Window state	1 = Open, 0 = Closed	1 bit	C	R	-	T	-	open/close	Low
↔	12	[In4] Disable Input	1 = Disable	1 bit	C	-	W	-	-	enable	Low
↔	13	[In4] Sensor Temperature Value	Temperature Value °C	2 bytes	C	R	-	T	-	temperature (°C)	Low
↔	14	[In4] Temperature Sensor Over-Heating	1 = Over-Heating; 0 = No Over-Heating	1 bit	C	R	-	T	-	alarm	Low
↔	15	[In4] Temperature Sensor Over-Cooling	1 = Over-Cooling; 0 = No Over-Cooling	1 bit	C	R	-	T	-	alarm	Low

Number	Name	Function	Description
0, 4, 8, 12	[In1..4] Disable Input	I = Disable	Allows disabling the Input via a I-Bit object
1, 5, 9, 13	[In1..4] Window state [In1..4] Sensor Temperature Value	I = Open, 0 = Closed Temperature Value °C	Output object with the status of the window (1 bit) or the temperature value measured by the external probe (2 bytes)
2, 6, 10, 14	[In1..4] Temperature Sensor Over-Heating	I = Over-Heating; 0 = No Over-Heating	Alarm output object in case of excess temperature according to the set threshold
3, 7, 11, 15	[In1..4] Temperature Sensor Over-Cooling	I = Sensor Over-Cooling; 0 = No Sensor Over-Cooling	Alarm Output Object in case of too low temperature according to the set threshold