KNX Home Automation

Manual KNX-TRH-IN4

M0770 - REV00
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General information

KNX-TRH-IN4 implements both the communication part (physical level + data-link) and the application part. The application part detects the analogue values of the integrated sensors and the rising or falling edges of the connected inputs, and transfers this information, together with the operating mode (hereinafter referred to as 'function') to the communication part, which handles the logic and physical interface with the KNX line. It is built in a non-modular housing, suitable for installation in flush-mounted boxes.

Characteristics

The characteristics are described with reference to fig. 1

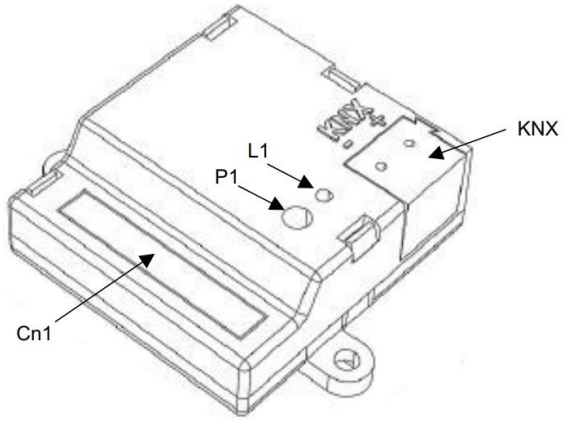


fig. 1

Mechanical

- Container: 54 l x 44 h x 17 d mm.
- Protection rating: IP20.
- Fixing: loose in insulated junction box or panel, fixed by means of two Ø 3 mm self-tapping screws with 48 mm fixing centre.
- Weight: 30 g
- Can also be installed in Ø 59 mm flush-mounted boxes.

Connections

KNX

For the bus connection, there is a 2-pole removable spring-loaded terminal block standard KNX TP1 (red + black) for rigid cables:

- Insulation stripping: 6mm.
- Clamping: spring
- Capacity: 4 x rigid wire; Ø 0.6 ÷0.8 mm.
- Terminal +V: BUS positive.
- Terminal -V: GND.

Inputs (Cn1)

The device is equipped with a removable 14-pin polarised connector.
8 x 15 cm wires (4 pairs) are provided for the inputs, allowing conventional push-buttons to be connected directly without having to replicate a common signal. The inputs of the different channels are marked with different colours:

- Channel 1 - BLUE wire (+ BLACK reference wire)
- Channel 2 - RED wire (+ BLACK reference wire)
- Channel 3 - GREEN wire (+ BLACK reference wire)
- Channel 4 - YELLOW wire (+ BLACK reference wire)

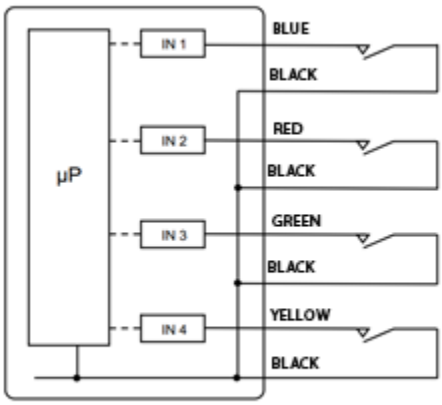


fig. 2

Cables can be extended to a maximum length of 10 metres.

- The input must come from a potential-free contact with reinforced insulation against dangerous voltages.
- The terminals of unused conductors must be adequately insulated, e.g. with insulating tape.

The sensor connections (4 black wires), on the same polarised connector, are made with a 20 cm long cable and are not extendable.

LED L1

When lit, it indicates the programming status of the device.

Programming button P1

Allows setting the device in programming mode.

Weather conditions

- Climate class according to EN 50491-2: 3K5.
- Operating ambient temperature range: -5 °C ÷ +45 °C.
- Relative humidity: max. 90% non-condensing.
- Storage conditions: -5 °C ÷ +45 °C; max RH 90%
- Transport conditions: -25 °C ÷ +70 °C.
- Max altitude: 2000 m a.s.l.

KNX bus power supply

- Bus rated voltage: 30 VDC
- Bus absorption: < 10 mA

Configuration and Commissioning

The functionality of the device is determined by the settings derived from the ETS4 (or later versions) and the freely downloadable application programme. No additional software tools or plug-ins are required. The application allows uploading the instrument into a new project and configuring
all the parameters of the product's operation, which are described in detail below.

General page

The device selectively activates all functions, both of the probe and of the inputs.

- Max. number of group addresses: 200
- Maximum number of associations: 200

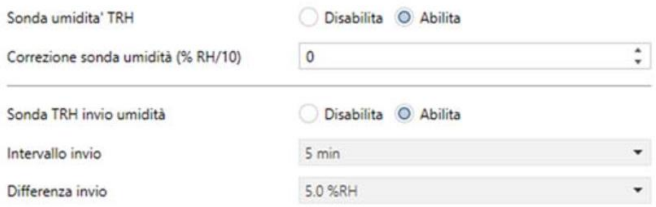
Activating the probe automatically opens its own configuration page, which mainly allows you to activate either temperature or humidity only, or both.

TRH Probe

The TRH probe allows simultaneous measurement of both temperature and relative humidity.
The first field, called **Temperature Probe Correction (°C/10)**, allows modifying the measurement by adding or subtracting a small offset expressed in tenths of a degree Celsius.

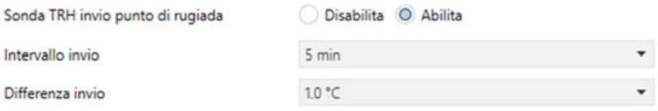
This parameter is not used to correct faults, but can be used to correct possible incorrect positioning, for example because the sensor has not been installed at the correct height.
The second field, named **TRH temperature sending probe**, is used to enable the periodic transmission of the measured value.
In doing so, ETS will open the communication object #34 to allow transmission of the temperature value (dtp 9.001 - Floating Point = 2 Bytes). The value can be sent at specific time intervals by configuring the **Send Interval** field, or at a specific change in the measured value by configuring the **Send Difference** field, or for both.

For humidity, the options are also similar



Again, it is possible to activate the sending of the measurement, correct the sampled value and select the event on which the data is to be notified.

There is also a Dew Point measurement, which depends on both humidity and temperature, and offers the same options as the other two measurements above.

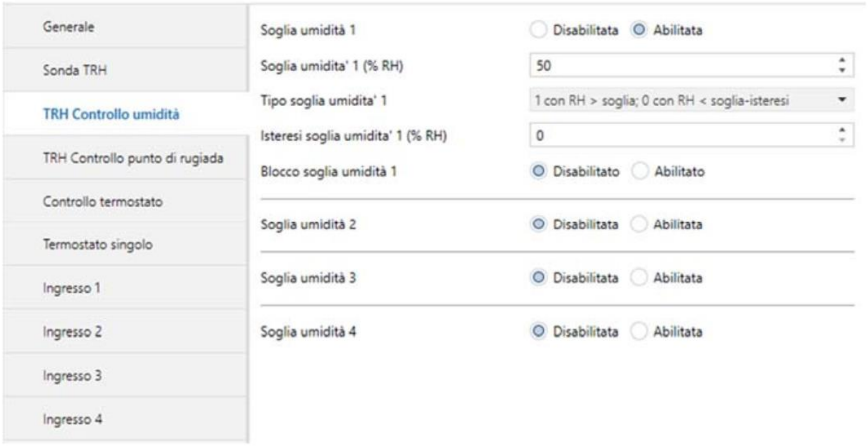


The Dew Point is the temperature at which a given amount of ambient humidity can be converted into moisture. This is a very important measure to prevent moisture from forming on a cold surface. The increase in temperature and humidity in summer climates causes the Dew Point to rise close to 20 °C, leading to the possibility of moisture forming on all surfaces below this temperature.
The notification of an alarm can be used to prevent damage to danger on floors used for cooling.

The activation of the humidity and dew point value controls triggers the presence of two new pages dedicated to the configuration of alarm thresholds.

TRH Humidity Control

The **TRH humidity control** table allows up to 4 thresholds to be activated, each defining a **Humidity threshold X (%RH)** intervention value above which an event telegram is sent.

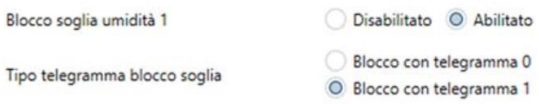


The **Humidity Threshold Type X** field allows defining how the threshold acts. In particular, it is possible to choose when to send value 1 (ON): when exceeding or falling below the threshold.

The effect of the hysteresis (anti-oscillation) can also be specified by defining whether it is to be added to the threshold value or subtracted from it.

The **Hysteresis of the Humidity Threshold X (%RH)** field allows defining the width of the hysteresis. The humidity threshold displays the communication object Alarm to signal that the threshold has been exceeded, and the Value and Value Status objects to modify it with possible supervision.

Finally, it is possible to block the action of each threshold with the option**Block threshold humidity X**.



If enabled, a telegram having a value of 0 or 1 (settable with **Threshold block telegram type**) will disable the threshold alarm signalling that the threshold has been exceeded:

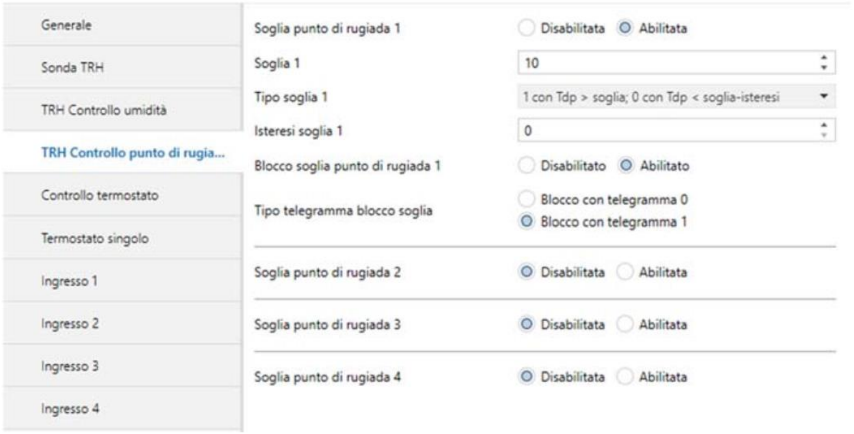
56	Soglia 1 umidita'	Disabilita allarme	1 bit	C	-	W	-	-	switch	Low
57	Soglia 2 umidita'	Disabilita allarme	1 bit	C	-	W	-	-	switch	Low
58	Soglia 3 umidita'	Disabilita allarme	1 bit	C	-	W	-	-	switch	Low
59	Soglia 4 umidita'	Disabilita allarme	1 bit	C	-	W	-	-	switch	Low

The relevant communication objects for the notification of the disabled status will also be opened:

102	Soglia 1 umidita'	Stato disabilitazione allarme	1 bit	C	R	-	T	-	switch	Low
103	Soglia 2 umidita'	Stato disabilitazione allarme	1 bit	C	R	-	T	-	switch	Low
104	Soglia 3 umidita'	Stato disabilitazione allarme	1 bit	C	R	-	T	-	switch	Low
105	Soglia 4 umidita'	Stato disabilitazione allarme	1 bit	C	R	-	T	-	switch	Low

TRH Dew point control

The **TRH dew point control** table also allows enabling up to 4 thresholds, defining for each one an intervention value (Threshold X), beyond which an event notification telegram is issued.



The **Threshold X type** field allows defining how the threshold acts. In particular, it is possible to choose when to send value 1 (ON): when exceeding or falling below the threshold.
Finally, the effect of the hysteresis (anti-oscillation) can also be specified by defining whether it is to be added to the threshold value or subtracted from it.

The **Hysteresis of Threshold X** field allows defining the amplitude of the hysteresis. The dew point threshold displays the communication object **Alarm** to signal that the threshold has been exceeded and the **Value** and **Value Status** objects to modify it with possible supervision.

40	Soglia 1 punto di rugiada	Allarme	1 bit	C	R	W	T	-	switch	Low
41	Soglia 2 punto di rugiada	Allarme	1 bit	C	R	W	T	-	switch	Low
42	Soglia 3 punto di rugiada	Allarme	1 bit	C	R	W	T	-	switch	Low
43	Soglia 4 punto di rugiada	Allarme	1 bit	C	R	W	T	-	switch	Low
44	Soglia 1 punto di rugiada	Valore	2 bytes	C	-	W	-	-	temperature (°C)	Low
45	Soglia 2 punto di rugiada	Valore	2 bytes	C	-	W	-	-	temperature (°C)	Low
46	Soglia 3 punto di rugiada	Valore	2 bytes	C	-	W	-	-	temperature (°C)	Low
47	Soglia 4 punto di rugiada	Valore	2 bytes	C	-	W	-	-	temperature (°C)	Low
106	Soglia 1 punto di rugiada	Stato valore	2 bytes	C	R	-	T	-	temperature (°C)	Low
107	Soglia 2 punto di rugiada	Stato valore	2 bytes	C	R	-	T	-	temperature (°C)	Low
108	Soglia 3 punto di rugiada	Stato valore	2 bytes	C	R	-	T	-	temperature (°C)	Low
109	Soglia 4 punto di rugiada	Stato valore	2 bytes	C	R	-	T	-	temperature (°C)	Low

As with humidity control, it is also possible to selectively block alarm actions for dew point thresholds:

Again, communication objects will be opened to activate the alarm block:

48	Soglia 1 punto rugiada	Disabilita allarme	1 bit	C	-	W	-	-	switch	Low
49	Soglia 2 punto rugiada	Disabilita allarme	1 bit	C	-	W	-	-	switch	Low
50	Soglia 3 punto rugiada	Disabilita allarme	1 bit	C	-	W	-	-	switch	Low
51	Soglia 4 punto rugiada	Disabilita allarme	1 bit	C	-	W	-	-	switch	Low

And those for block status notification:

110	Soglia 1 punto di rugiada	Stato disabilitazione allarme	1 bit	C	R	-	T	-	switch	Low
111	Soglia 2 punto di rugiada	Stato disabilitazione allarme	1 bit	C	R	-	T	-	switch	Low
112	Soglia 3 punto di rugiada	Stato disabilitazione allarme	1 bit	C	R	-	T	-	switch	Low
113	Soglia 4 punto di rugiada	Stato disabilitazione allarme	1 bit	C	R	-	T	-	switch	Low

Thermostat

The thermostat is the device that regulates the operation of a thermal machine in order to maintain a constant temperature in an environment (setpoint). It is configured and can only be adjusted via ETS-programmable KNX communication objects.
By enabling the **Thermostat Function** in the TRH Probe menu, ETS displays the **Thermostat Control** and **Single Thermostat** (or **Double Thermostat**) pages required to enter all operating parameters.

The first parameter is called **Thermostat Type** and allows allocating or not two separate controls **(Double** thermostat) to summer and winter, in case heating and cooling depend on two separate thermal machines.
Following this activation, ETS automatically inserts two configuration pages dedicated to winter and summer.

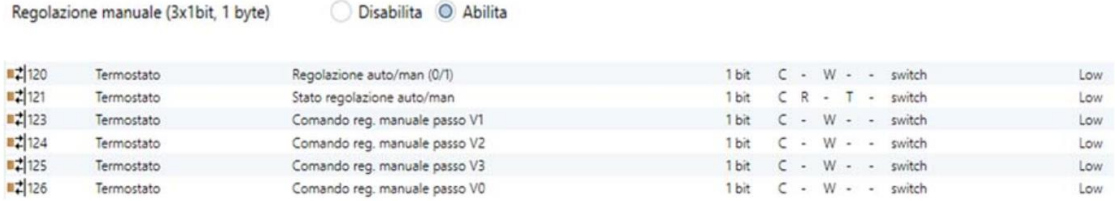
The second and third parameters are used to tell the thermostat how it should configure itself on start-up, after being programmed with ETS. **Enabled/Disabled status on start-up** will define whether it should start as off (Disable) or as on (Enable).
Default summer/winter will define whether it should cool down (Summer) or heat up (Winter). After the first run, in the event of a power failure, the device will always remember the last status.

Keycard reader function. By combining this object with the contact of a presence reader (e.g. keycard), it is possible to put the thermostat on standby when the air-conditioned room is unoccupied (card missing) and to restore comfort when the card is present. Its status is displayed on object #128.

Window contact management This parameter is used to enable or disable window opening management; event acquired via communication object #96. If the window is opened, the thermostat switches to Protection mode, without delay. When the window is closed, the thermostat resets to the status it was in before the opening.
Note: When the window is open, the thermostat does not implement mode change commands, but stores them and implements them when closing.

Window contact type indicates how to decode the input data to determine the open window status.

Manual adjustment (3x1bit, 1 byte)
The parameter makes visible the different configuration items for remote control of the thermostat in fancoil modes for speeds, objects: #123 Fan 1 speed , #124 Fan 2 speed, #125 Fan 3 speed, #126 Fan 0 speed. These will be executed by the thermostat if the latter is set to Manual mode by object #120 Auto 'bit 0'-Manual 'bit 1', object #121 is its status.



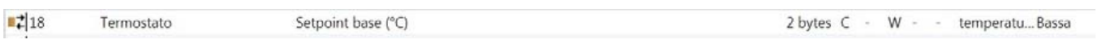
Thermostat configuration

The thermostat configuration page appears differently depending on whether a single or a double Thermostat has been chosen.
In the case of a **single thermostat**, where one actuator regulates both summer and winter, it will be necessary to set the reference temperatures for both seasons.

In the case of a **double thermostat**, however, each configuration page will only store the temperatures relating to its season.
The thermostat can be programmed to have 4 ideal operating temperatures to suit different conditions of use in the home:

- **Winter comfort setpoint (°C/10):** this is the ideal temperature preferred by the owner when when the house is occupied during the day.
- **Winter Standby Setpoint Decrease (°C/10):** this is the temperature reduction (relative to the Comfort setpoint) that should be set in the room when leaving the house in order to obtain the best energy savings.
- **Winter Night Setpoint Decrease (°C/10):** this is the temperature reduction (relative to the comfort temperature) that should be set for the night.
- **Cold Setpoint Protection (°C):** this is the minimum operating temperature that must be maintained in winter, when the house is left unoccupied for long periods, in order to prevent the water pipes from freezing.

These temperatures can be programmed with ETS and retrieved on demand to set the air conditioning to the best conditions for comfort, energy saving and safety.
The Comfort temperature is the reference temperature and is initially programmed with ETS and can then be changed remotely with the appropriate communication object (Base setpoint).



The Standby and Night temperatures depend on the difference in the comfort temperature according to the decrements set with ETS. Changing the comfort temperature also changes the standby and night temperatures:

Standby temperature = Comfort temperature - Standby Setpoint Decrease
Night temperature = Comfort temperature - Night Setpoint decrease

Temperatures are defined in tenths of a degree. Assigning the value 200 therefore means assigning a temperature of 20.0 °C.

The Protection temperature is the recommended temperature when you have to leave the house closed and must be set to the minimum value sufficient to prevent the formation of ice in the pipes.
The default value is 7 °C.

The various operating modes, Comfort, Standby, Night and Protection, can be activated by means of the corresponding communication objects, available both in byte format for communication with a supervision unit, and in bit format for activation by events reported on the bus.

76	Termostato	Set modo comfort	1 bit	C	R	W	-	-	switch	Bassa
77	Termostato	Set modo standby	1 bit	C	R	W	-	-	switch	Bassa
78	Termostato	Set modo night	1 bit	C	R	W	-	-	switch	Bassa
79	Termostato	Set modo protection	1 bit	C	R	W	-	-	switch	Bassa
80	Termostato	Set modi	1 byte	C	R	W	-	-	8-bit unsi...	Bassa

For the summer season, standby and night temperatures will still refer to comfort, but this time with increments. The protection temperature will be the maximum permissible for the non-occupied building.

After the air conditioning zones have been set, it is necessary to define the type of actuation to be carried out on the thermal machine. The thermostat provides four types of actuation.

On-Off (1 bit)

This is the classic operation of traditional thermostats, which switch on the boiler in winter when the temperature falls below the setpoint and switch on the cooler in summer when the temperature rises above the setpoint. The thermostat controls the start-up of the thermal machine via its
communication Output (on-off):

Singolo

20	Termostato	Uscita (on-off)	1 bit	C	R	-	T	-	switch	Low

Doppio

20	Termostato	Uscita estate (on-off)	1 bit	C	R	-	T	-	switch	Low
29	Termostato	Uscita inverno (on-off)	1 bit	C	R	-	T	-	switch	Low

In order to avoid continuous switching on and off of the thermal machine, it is possible to insert actions that restrict oscillations. One method is to enable the **Hysteresis**function. In this way, the execution of the ON command does not take place until the setpoint + hysteresis temperature has been exceeded, just as the subsequent release does not take

place until the temperature falls below the setpoint - hysteresis temperature. Different hysteresis can be defined for each season, expressed in tenths of °C.

On-Off in steps (3 x 1bit)

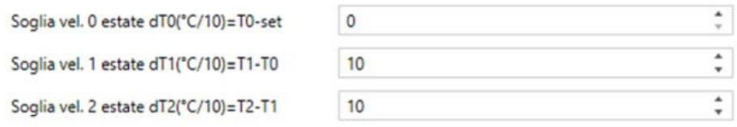
This is the operation intended for use with Fancoils. The traditional control (on/off output), which remains available to start the thermal machine or the recirculation pump, is accompanied by a second control to adjust
the ventilation speed.

The ventilation works according to how large the gap is between the room temperature and the setpoint, and the speed is reduced as the desired climate is approached.

V1 is the command executed when the room temperature is between the Setpoint temperature and the temperature of the first T1 threshold.
V2 is the command executed when the room temperature is between the first T1 threshold temperature and the second T2 threshold temperature.
V3 is the command that is executed when the ambient temperature is above the temperature of the second T2 threshold.

Note: below the first T1 threshold, a T0 threshold is defined, below which the ventilation is switched off (V0) while keeping the air conditioning on. If dT0 = 0 is set, this dead zone is eliminated.

Thresholds are defined by how far apart they are. In summer, of course, the differences are negative:

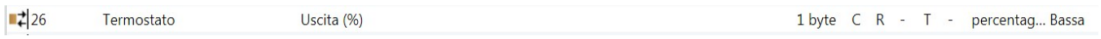


A hysteresis for each season is also available for this type of regulation;

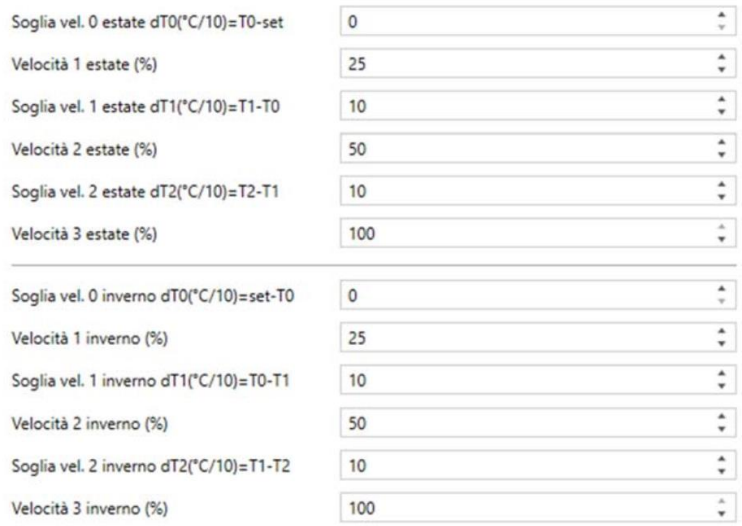
it is also possible to introduce a delay (different for each season) (Fan control delay) to allow the water in the heat exchanger coil to heat up before ventilation starts.
Finally, a further parameter (Fan speed change delay) allows introducing a delay between the deactivation of one speed and the activation of the next.

% in steps (bytes)

This operation is the same as the previous one for use with Fancoils, but instead of the speeds being controlled by 3 x on/off communication objects, it provides for the sending of three different speed values, expressed as a percentage, on a single 1-byte communication object called Output (%).



The adjustment of the T1 and T2 activation thresholds is exactly the same as in the previous case. The three different speed values to be sent on Output (%) must be defined in the following fields: Speed 1, Speed 2 and Speed 3.



A hysteresis for each season is also available for this type of regulation;

and the **Fan control delay** seen above.

% PI continuous (bytes)

This is the operation intended for proportionally adjustable thermal machines.
The action of the thermostat consists in sending a percentage value that is updated every 30 seconds, decreasing as it approaches the setpoint temperature. If the system parameterisation is carried out well, a situation should be reached in which the percentage reaches a stationary value sufficient to keep the ambient temperature constant. The parameterisation of the system is carried out by entering two values called: **Proportional part (°K)** and **Integrative part (min)**.
These two terms express how quickly **(min**) the system is able to heat the room by a certain number of degrees **(°K**).

The length of the time interval should be at least equal to the time required to reach steady-state conditions under normal operating conditions, starting from the standby temperature and ending at the setpoint temperature.

The two parameters described above can only be set if **Customised** heating/cooling is chosen. However, some heating system models are already defined (Hot Water, Underfloor, etc.) for which the two parameters are already set to optimised (and not modifiable) values:

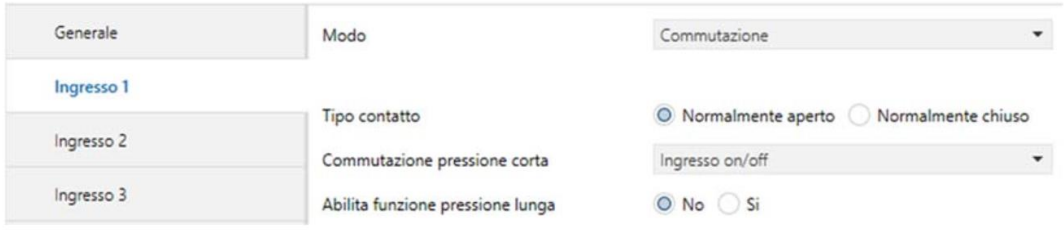
Riscaldamento:

Raffrescamento:

Input 1, Input 2, Input 3, Input 4

The ETS library features a set of parameters used to characterise the operation of each button interface input. The parameters are divided into four pages for the configuration of each channel, with the addition of a main page from which the sensitivity of the digital inputs can be adjusted.
Below is the General parameter page that can be reached by activating the ETS Edit Parameters control.
The **General** page allows editing the parameters shared by all input channels. In particular, it allows changing intervention time of the debounce filter on the digital inputs, preventing false contacts from generating several simultaneous controls on the bus. The 25 ms default setting is generally suitable for design purposes.
However, if false contacts occur, this value can be increased to limit these problems.

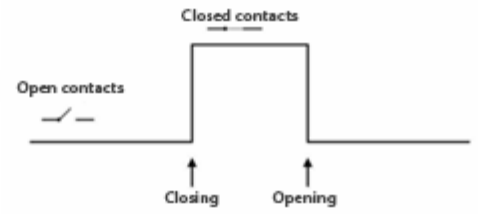
The image below shows the page that typically opens the input channel configuration page.



The first parameter, **Mode**, is the most important and determines the operating mode of the corresponding input. Five different operating modes are available and will be illustrated below. The remaining parameters are determined dynamically according to the type of function selected and will change on a case-by-case basis.
Each input is initially configured as Disabled.

Switching

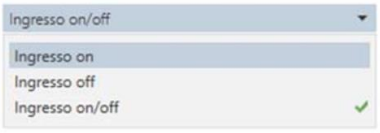
Switching mode allows a KNX telegram to be sent to coincide with one of the possible events that can be performed with the contacts wired to the inputs.
By defining a **Contact Type** as **Normally Open**, the telegram will be transmitted upon closure of the contacts.



Each time the contacts are closed, a telegram is sent, the value of which can be specified by the short press function parameter. This value may always be the same or change with each event.

By defining a **Contact Type** as **Normally Closed**, the telegram will be transmitted uponopening of the contacts. The definition of the Contact type property determines the event upon which the telegram will be transmitted on the KNX bus.

Short press switching

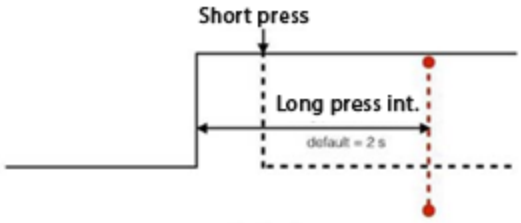


- By selecting ON, the ON value (1) will be transmitted at each event.
- By selecting OFF, the OFF value (0) will be transmitted at each event.
- By selecting ON/OFF, the value transmitted will change at each event, alternating between ON and OFF (Toggle Mode).

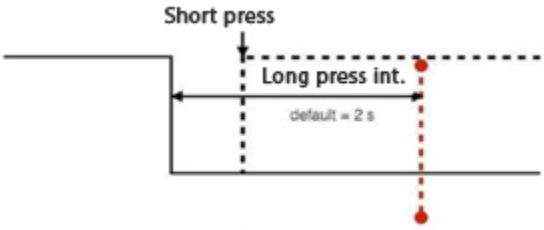
Long press

Finally, it is possible to enable the **Long Press Function** mode.
This allows two events to be handled with each input:

The short press activates a certain KNX control, whereas the long press activates another KNX control. This feature allows doubling the number of commands that can be managed with a push-button interface.
Enabling this function activates the configuration of two new parameters.
The first, identified as **Long press function**, allows the value definition to be transmitted, similarly to the procedure already described for the Short Press.
The **Long press Interval** indicates the press time required to trigger the relevant event.

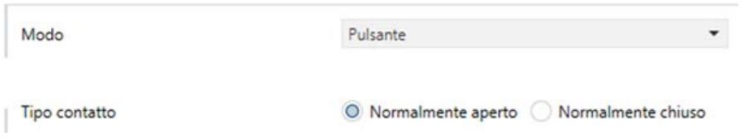


If the contact type is Normally Closed, the operating logic just described is completely reversed.

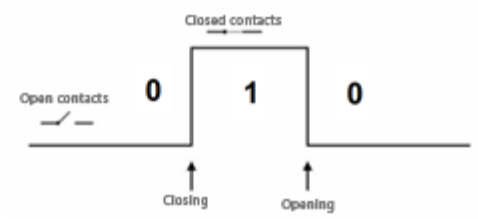


The Switching mode displays an extremely simple 1-bit communication object for transmitting commands to other KNX devices. This object is created to notify a change of status that occurs in the field, coinciding with the contacts already mentioned. Therefore, no other object will be found to notify the change of status.
This single communication object is also very useful for synchronising the status of inputs with events notified on the KNX bus.

Button



This is the mode suitable for connection to a button. The device constantly reads the input status and transmits a telegram whenever it detects a change. This means that a telegram is transmitted every time there is a change in the status of our inputs.
If a button is used, a telegram is transmitted when pressure is applied and subsequently a telegram is transmitted when it is released.
As in the previous case, Contact Type is the property that determines the event that is used to synchronise the notification of telegrams on the KNX bus. If Contact Type is defined as Normally Open (standard), the datum is sent on the rising edge, i.e. it is 1 when the contact is closed and 0 when the contact is opened.



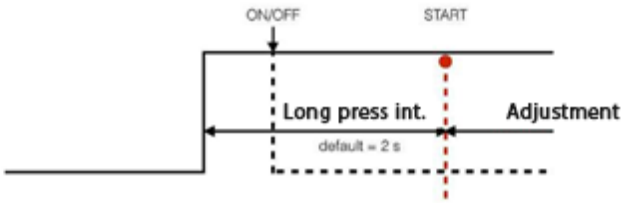
If Contact Type is defined as Normally Closed, telegram 1 is sent at the end of the Closed contacts event and the logic is reversed.
Therefore, it will read 1 when the contacts are open and 0 when the contacts are closed. The Button mode also displays a single plain communication object that operates in the manner already described for the Switching function.

Dimmer

This is the function suitable for adjusting the brightness of a dimmable light. The Dimmer function is one of the modes that automatically enables the use of a long-press function to have a second control available.
The short press control is used to switch the light on and off and enables a 1-bit communication object called Switching; it will operate in exactly the same way as the previously described switching function.

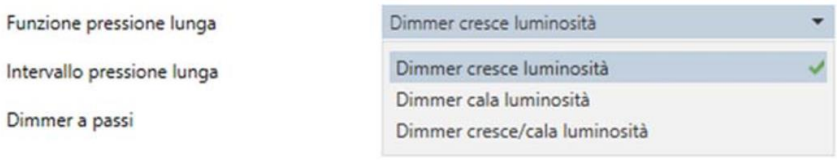
The Long press control is used to adjust the light intensity and enables a 4-bit communication object called Adjustment.

This means that a short press is all that is needed to switch the light on and off, while to adjust the brightness, the control must be held down until the desired brightness is achieved.
After the time required to activate the Long control, an adjustment START control telegram will be transmitted. After obtaining the desired brightness we can release the button
automatically sending the adjustment STOP command.



As in all previous cases, the Contact Type property defined Normally Closed will reverse the operating logic. The effectiveness of the adjustment depends mainly on the speed at which the dimmer changes the brightness, and is a parameter that can generally be set with the actuator.

The long press control can operate in three different modes. It can operate in **Brighter** mode to increase the brightness, or in **Darker** mode to decrease the brightness, or it can alternate between these two modes to be able to fully control the dimmer with a single control.

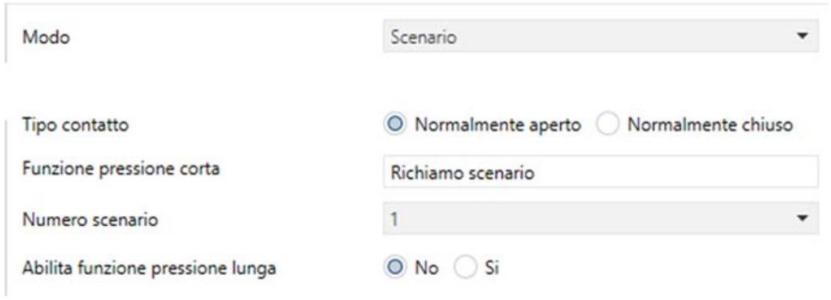


Finally, the Dimmer step parameter is described below. This parameter determines by how much we can increase or decrease the brightness with a single long press action.

- 100% means being able to increase or decrease brightness throughout the required range
- 50% means being able to increase or decrease the brightness to half the required range. This means that in order to cover the full range, we need to perform two actions.

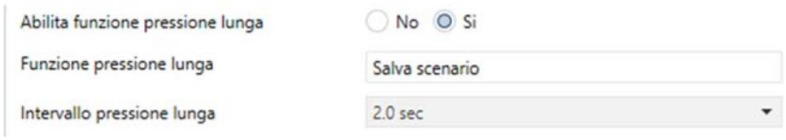
The possible variation with a single action can decrease up to 1%

Scenario



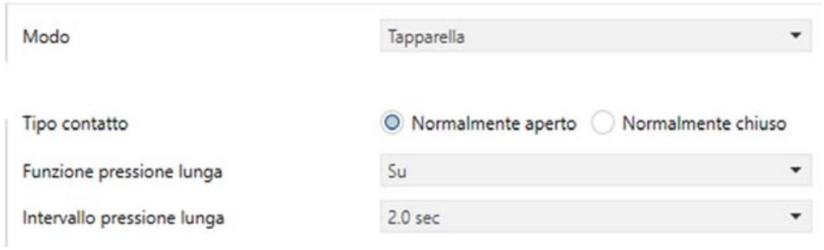
This is the function that allows controlling the KNX scenarios. Controlling a KNX scenario means being able to retrieve it when needed or being able to store a new configuration. Each scenario is defined by an identification number (ID) that can vary from 1 to 64. The activation of a scenario consists in the sending of a byte with a value (ID - 1) to the KNX bus

This command is assigned to the Short press function.
Therefore, each time a short press is applied, the configured scenario will be retrieved.
Storing a new scenario consists in the sending of a byte with value (ID + 64) to the KNX bus . The transmission of the memory storage command is assigned to the Long press function.

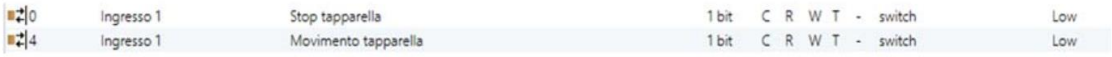


Therefore, each time a long press is applied, a new scenario programming will be controlled.
This function can be enabled or disabled via the **Enable long press function** property.

Roller shutter

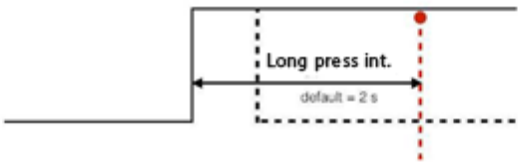


This is the function for controlling the actuators of the roller shutters.
The main feature of a roller shutter/Venetian blind control is the fact that it is operated via two different group addresses: the first is used to control the movement of the roller shutter, the second is used to control the roller shutter stop and the movement of the Venetian blind slats.



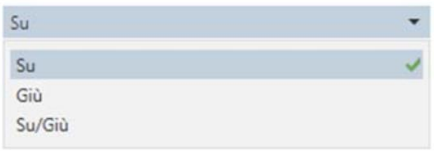
Therefore, the interface must necessarily display two distinct communication objects for movement and stopping.

- The Stop command is assigned to the short press function
- Movement control is assigned to the long press function



This means that each short press stops the roller shutter and each long press starts the roller shutter.
This setting allows starting the roller shutter and lets it run all the way to the end of the stroke without having to hold the button down.
If you wish to stop it earlier, a short press can be applied to send a Stop command.

The movement control can be programmed either to roll up the shutter (Up = 0) or to roll it down (Down = 1). When assigning a specific movement to an input, it is important to remember that two inputs are required to fully control the actuator: one to roll up the shutter and the other to roll it down. È inoltre
An Up/Down mode is also available to save interface resources and to be able to always toggle the command sent. In this way, a single channel can be used for both functions.



The value assigned to Stop, in order to stop the movement of the shutter, is generally not influential. Regardless of the assigned value, it always causes the roller shutter to stop.

A different case is that of a shutter that has already stopped.
In this case, sending a Stop command is interpreted as a command to actuate the slats to adjust the brightness through the Venetian blind.
In this case, the value assigned to Stop determines the direction of slat rotation, increasing or decreasing the light blocking capacity of the Venetian blind.
Our interface always sends a slat command in the opposite direction of rotation to the last movement performed, to reflect the different position of the slats after the Venetian blind has been rolled up or down.
The downward stroke (Down = 1) of the Venetian blind is always preceded by the release of the slats in the fully light-blocking position, so the next slat adjustment must be in the opposite direction to increase brightness (Stop = 0).
Conversely, the upward stroke (Up = 0) of the Venetian blind is always preceded by the return of the slats to a horizontal position, with minimum light-blocking effect, so the subsequent adjustment of the slats must be in the opposite direction to increase the light-blocking effect (Stop = 1).

Communication objects sequential list

No.	Object name	Enabling condition	Dim.	Flags					DPT
0 +[n-1]	Input n – Switching (1 ≤ n ≤ 4)	Input n Mode = Switch	1 Bit	C	R	W	T		[1.001] switch
0 +[n-1]	Input n – Button (1 ≤ n ≤ 4)	Input n Mode = Button	1 Bit	C	R	W	T		[1.001] switch
0 +[n-1]	Dimmer n – Switching (1 ≤ n ≤ 4)	Input n Mode = Dimmer	1 Bit	C	R	W	T		[1.001] switch
0 +[n-1]	Input n – Blind shutter stop (1 ≤ n ≤ 4)	Input n Mode = Blind-Shutter	1 Bit	C	R	W	T		[1.007] step
1 ... 3	Input n – Switching Input n – Button Dimmer n – Switching Input n – Blind-shutter stop								
4 +[n-1]	Input n – Switch. long press (1 ≤ n ≤ 4)	Input n Mode = Switch	1 Bit	C	R	W	T		[1.001] switch
4 +[n-1]	Input n – Blind shutter move (1 ≤ n ≤ 4)	Input n Mode = Blind-Shutter	1 Bit	C	R	W	T		[1.008] up/down
5 ... 7	Input n – Switching long press Input n – Blind-shutter move								
8 +[n-1]	Dimmer n – Dimming (1 ≤ n ≤ 4)	Input n Mode = Dimmer	4 Bit	C	R		T		[3.007] Dimming control
9 ... 11	Dimmer n – Dimming								
12 +[n-1]	Scene n – Scene n value (1 ≤ n ≤ 4)	Input n Mode = Scene	1 Byte	C	R		T		[18.001] Scene control
13 ... 15	Scene n – Scene n value								
18	Thermostat – Base setpoint summer	Thermostat function = Enabled	2 Byte	C	R	W	T		[9.001] temperature (°C)
19	Thermostat – Enable	Thermostat function = Enabled	1 Bit	C		W			[1.003] enable
20	Thermostat – Output summer on/off	Thermostat function = Enabled Thermostat type = Double	1 Bit	C	R		T		[1.001] switch
20	Thermostat – Output on/off	Thermostat function = Enabled Thermostat type = Single	1 Bit	C	R		T		[1.001] switch
21	Thermostat – Summer-winter select.	Thermostat function = Enabled	1 Bit	C		W			[1.100] cooling/heating
22	Thermostat – Step V1 output summer	Thermostat function = Enabled Thermostat type = Double Regul. type summer = On-Off steps	1 Bit	C	R		T		[1.001] switch
22	Thermostat – Step V1 output	Thermostat function = Enabled Thermostat type = Single Regul. type summer = On-Off steps	1 Bit	C	R		T		[1.001] switch
23	Thermostat – Step V2 output summer	Thermostat function = Enabled Thermostat type = Double Regul. type summer = On-Off steps	1 Bit	C	R		T		[1.001] switch
23	Thermostat – Step V2 output	Thermostat function = Enabled Thermostat type = Single Regul. type summer = On-Off steps	1 Bit	C	R		T		[1.001] switch
24	Thermostat – Step V3 output summer	Thermostat function = Enabled Thermostat type = Double Regul. type summer = On-Off steps	1 Bit	C	R		T		[1.001] switch
24	Thermostat – Step V3 output	Thermostat function = Enabled Thermostat type = Single Regul. type summer = On-Off steps	1 Bit	C	R		T		[1.001] switch
26	Thermostat – Output %	Thermostat function = Enabled Thermostat type = Single Regulator type summer = % Steps or Contin.	1 Byte	C	R		T		[5.001] Percentage (0..100%)
26	Thermostat – Output summer %	Thermostat function = Enabled Thermostat type = Double Regulator type summer = % Steps or Contin.	1 Byte	C	R		T		[5.001] Percentage (0..100%)

27	Thermostat – Output winter %	Thermostat function = Enabled Thermostat type = Double Regulator type winter = % Steps or Contin.	1 Byte	C	R		T		[5.001] Percentage (0..100%)
28	Thermostat – Base setpoint winter	Thermostat function = Enabled	2 Byte	C	R	W	T		[9.001] temperature (°C)
29	Thermostat – Output winter on/off	Thermostat function = Enabled Thermostat type = Double	1 Bit	C	R		T		[1.001] switch
30	Thermostat – Step V1 output winter	Thermostat function = Enabled Thermostat type = Double Regul. type winter = On-Off steps	1 Bit	C	R		T		[1.001] switch
31	Thermostat – Step V2 output winter	Thermostat function = Enabled Thermostat type = Double Regul. type winter = On-Off steps	1 Bit	C	R		T		[1.001] switch
32	Thermostat – Step V3 output winter	Thermostat function = Enabled Thermostat type = Double Regul. type winter = On-Off steps	1 Bit	C	R		T		[1.001] switch
33	TRH probe – Relat. humid. (RH%)	TRH probe = Enabled TRH humidity probe = Enable TRH probe send humidity = Enabled	2 Byte	C	R		T		[9.007] humidity (%)
34	TRH probe – Temperature (°C)	TRH probe = Enabled TRH temperature probe = Enable TRH probe send temperature = Enabled	2 Byte	C	R		T		[9.001] temperature (°C)
35 +[n-1]	Humid. thresh. n – Alarm (1 ≤ n ≤ 4)	TRH probe = Enabled TRH humidity probe = Enable Humidity thresh. n = Enabled	1 Bit	C	R	W	T		[1.001] switch
36 … 38	Humid. thresh. n – Alarm								
39	Probe TRH – Dew point temp. (°C)	TRH probe = Enabled TRH humidity probe = Enable TRH probe send dew point = Enabled	2 Byte	C	R		T		[9.001] temperature (°C)
40 +[n-1]	Dew point thresh. n – Alarm (1 ≤ n ≤ 4)	TRH probe = Enabled TRH humidity probe = Enable TRH dew point control = Enabled Dew point threshold n = Enabled	1 Bit	C	R	W	T		[1.001] switch
41 … 43	Dew point thresh. n – Alarm								
44 +[n-1]	Dew point thresh. n – Value (1 ≤ n ≤ 4)	TRH probe = Enabled TRH humidity probe = Enable TRH dew point control = Enabled Dew point threshold n = Enabled	2 Byte	C		W			[9.001] temperature (°C)
45 … 47	Dew point thresh. n – Value								
48 +[n-1]	Dew p. thre. n – Alarm dis. (1 ≤ n ≤ 4)	TRH probe = Enabled TRH humidity probe = Enable TRH dew point control = Enabled Dew point threshold n = Enabled Dew point lock funct. threshold n = Enabled	1 Bit	C		W			[1.001] switch
49 … 51	Dew point threshold n – Alarm disable								
52 +[n-1]	Humid. thresh. n – Value (1 ≤ n ≤ 4)	TRH probe = Enabled TRH humidity probe = Enable Humidity thresh. n = Enabled	2 Byte	C		W			[9.007] humidity (%)
53 … 55	Humid. threshold n – Value								
56 +[n-1]	Hum. thr. n – Alarm disable (1 ≤ n ≤ 4)	TRH probe = Enabled TRH humidity probe = Enable Humidity thresh. n = Enabled Humidity lock function thresh. n = Enabled	1 Bit	C		W			[1.001] switch
57 … 59	Humidity threshold n – Alarm disable								
60	Thermostat – Setpoint status (°C)	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	2 Byte	C	R		T		[9.001] temperature (°C)

62	Thermostat – Enable status	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	1 Bit	C	R		T		[1.011] state
63	Thermostat – Summer-winter selection status	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	1 Bit	C	R		T		[1.100] cooling/heating
76	Thermostat – Set confort mode	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	1 Bit	C	R	W			[1.001] switch
77	Thermostat – Set standby mode	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	1 Bit	C	R	W			[1.001] switch
78	Thermostat – Set night mode	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	1 Bit	C	R	W			[1.001] switch
79	Thermostat – Set protection mode	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	1 Bit	C	R	W			[1.001] switch
80	Thermostat – Set modes	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	1 Byte	C	R	W			[20.102] HVAC mode
81	Thermostat – Confort mode status	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	1 Bit	C	R		T		[1.001] switch
82	Thermostat – Standby mode status	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	1 Bit	C	R		T		[1.001] switch
83	Thermostat – Night mode status	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	1 Bit	C	R		T		[1.001] switch
84	Thermostat – Protection mode status	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	1 Bit	C	R		T		[1.001] switch
85	Thermostat – Modes status	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	1 Byte	C	R		T		[20.102] HVAC mode
96	Thermostat – Open window signal	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled Window contact management = Enabled	1 Bit	C	R	W			[1.001] switch
97	Thermostat – Open window status	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled Window contact management = Enabled	1 Bit	C	R		T		[1.001] switch
98 +[n-1]	Humidity threshold n – (1 ≤ n ≤ 4) Value status	TRH probe = Enabled TRH humidity probe = Enable TRH probe humidity control = Enabled Humidity thresh. n = Enabled	2 Byte	C	R		T		[9.007] humidity (%)
99 ... **101**	Humidity threshold n – Value status								
102 +[n-1]	Humidity threshold n – (1 ≤ n ≤ 4) Alarm disable status	TRH probe = Enabled TRH humidity probe = Enable TRH probe humidity control = Enabled Humidity thresh. n = Enabled Humidity lock funct. threshold n = Enabled	1 Bit	C	R		T		[1.001] switch
103 ... **105**	Humidity threshold n – Alarm disable status								
106 +[n-1]	Dew point threshold n – (1 ≤ n ≤ 4) Value status	TRH probe = Enabled TRH humidity probe = Enable TRH dew point control = Enabled Dew point threshold n = Enabled	2 Byte	C	R		T		[9.001] temperature (°C)
107 ... **109**	Dew point threshold n – Value status								

110 +[n-1]	Dew point threshold n – (1 ≤ n ≤ 4) Alarm disable status	TRH probe = Enabled TRH humidity probe = Enable TRH dew point control = Enabled Dew point threshold n = Enabled	1 Bit	C	R		T		[1.001] switch
111 ... 113	Dew point threshold n – Alarm disable status								
117	Thermostat – Delta setp standby mode summer	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	2 Byte	C	R	W			[9.002] temperature differen. (K)
118	Thermostat – Delta setp night mode summer	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	2 Byte	C	R	W			[9.002] temperature differen. (K)
119	Thermostat – Temporary setpoint (°C)	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	2 Byte	C		W			[9.001] temperature (°C)
120	Thermostat – Auto/Man regulation (0/1)	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled Manual regulation = Enable	1 Bit	C		W			[1.001] switch
121	Thermostat – Auto/Man regulation status	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled Manual regulation = Enable	1 Bit	C	R		T		[1.001] switch
123	Thermostat – Manual regulation input step V1	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled Manual regulation = Enable	1 Bit	C		W			[1.001] switch
124	Thermostat – Manual regulation input step V2	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled Manual regulation = Enable	1 Bit	C		W			[1.001] switch
125	Thermostat – Manual regulation input step V3	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled Manual regulation = Enable	1 Bit	C		W			[1.001] switch
126	Thermostat – Manual regulation input step V0	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled Manual regulation = Enable	1 Bit	C		W			[1.001] switch
127	Keycard holder – Set standby/comfort (0/1)	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled Keycard holder function = Enabled	1 Bit	C		W			[1.001] switch
128	Keycard holder – Status standby/comfort (0/1)	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled Keycard holder function = Enabled	1 Bit	C	R		T		[1.001] switch
131	Thermostat – Delta setp standby mode winter	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	2 Byte	C	R	W			[9.002] temperature differen. (K)
132	Thermostat – Delta setp night mode winter	TRH probe = Enabled TRH temperature probe = Enable Thermostat function = Enabled	2 Byte	C	R	W			[9.002] temperature differen. (K)

Regulatory compliance

- RoHS Directive 2011/65/EU
- REACh Regulation (EC) No. 1907/2006

- EN 50491-2 General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS). Part 2: Environmental conditions.

- EN 50491-3 General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS). Part 3: Electrical safety requirements.

- EN 50491-4-1 General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS). Part 4-1: General functional safety requirements for products intended to be integrated in HBES and BACS systems

- EN 50491-5-1 General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS). Part 5-1: Electromagnetic Compatibility (EMC) test requirements, conditions and set-ups.

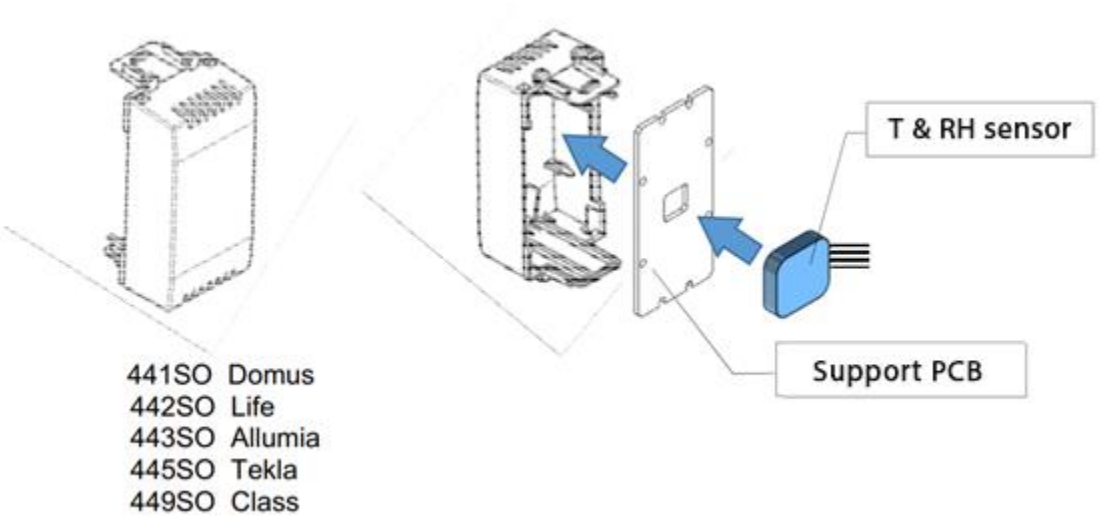
- EN 50491-5-2 General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS). Part 5-3: Electromagnetic compatibility (EMC) requirements for HBES/BACS devices used in residential, commercial and light industrial environments.

- EN 50428 Switches for household and similar fixed electrical installations - Collateral standard - Switches and related accessories for use in home and building electronic systems (HBES).

Installation and use

The module can be installed in flush-mounted boxes or other enclosures that provide the most appropriate degree of protection for the installation room. For the temperature and humidity probe, however, it is important to consider both the correct positioning in the room and the appropriate protection rating.

The supplied PCB holder can be used for System 44 flush-mounted or wall-mounted boxes, where it can be installed on the probe holder, code 44xSO, as follows:



Positioning

For optimum adjustment, the probe should preferably be mounted vertically on an interior wall at a height of 1.5 m from the floor and at least 30 cm away from doors. Do not install the device near heat sources such as radiators or household appliances, near elements that radiate heat during normal operation (e.g. dimmers, etc.), or in locations exposed to direct sunlight. Also avoid 'hidden' positions (niches, etc.).