KNX TH65-AP

Thermo-Hygrometer

Item number 70184

elsner elektronik

Installation and Adjustment

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This manual is amended periodically and will be brought into line with new software releases. The change status (software version and date) can be found in the contents footer. If you have a device with a later software version, please check **www.elsner-elektronik.de** in the menu area "Service" to find out whether a more up-to-date version of the manual is available.

Clarification of signs used in this manual

Safety advice.

Safety advice for working on electrical connections, components, etc.

DANGER! ... indicates an immediately hazardous situation which will lead to death or severe injuries if it is not avoided.

WARNING! ... indicates a potentially hazardous situation which may lead to death or severe injuries if it is not avoided.

CAUTION! ... indicates a potentially hazardous situation which may lead to trivial or minor injuries if it is not avoided.

ATTENTION! ... indicates a situation which may lead to damage to property if it is not avoided.

ETS In the ETS tables, the parameter default settings are marked by underlining.

1. Description

The Temperature and Humidity Sensor **KNX TH65-AP** measures temperature and humidity in indoor and outdoor areas and calculates the dew point. The sensor can receive external measured values via the bus and process them with the own data to an overall temperature and overall air humidity (mixed values).

The **KNX TH65-AP** provides seven switching outputs with adjustable threshold values as well as additional AND and OR logic gates. The sensor has got a PI controller for heating and cooling (depending on temperature) and for ventilation (depending on air humidity) and it can emit a warning to the bus as soon as the area of optimum comfort (according to DIN 1946) is left.

Functions:

- **Measurement of temperature and air humidity** (relative and absolute), calculation of **dew point**
- **Mixed values** from own measured values and external values (proportions can be set in percentage)
- **PI controller for heating** (one or two step) and **cooling** (one or two step) depending on temperature
- **PI controller for ventilation** depending on humidity: Dehumidify/humidify (one step) or dehumidify (one or two step)
- **Threshold values** can be adjusted per parameter or via communication objects
- **4 AND and 4 OR logic gates** with each 4 inputs. Every switching incident as well as 8 logic inputs in the form of communication objects may be used as inputs for the logic gates. The output of each gate may optionally be configured as 1 bit or 2 x 8 bits

Configuration is made using the KNX software ETS. The **product file** can be downloaded from the Elsner Elektronik website on **www.elsner-elektronik.de** in the "Service" menu.

1.0.1. Scope of supply

- Sensor in on-wall housing

1.1. Technical specifications

Housing	Plastic material, sensor sleeve metal
Colour	Grey
Mounting	On-wall
Degree of protection	Casing: IP65 Outside sensor: IP43
Dimensions	approx. 65 × 91 × 38 (W × H × D, mm)
Weight	approx. 80 g

Ambient temperature	Operation -25…+80°C, Storage -55…+105°C, avoid bedewing
Operating voltage	KNX bus voltage
Bus current	max. 5,5 mA, max. 9 mA when programming LED is active
Data output	KNX +/- bus terminal plug
Group addresses	max. 184
Allocations	max. 184
Communication objects	110
Measurement range temperature	-25...+80°C
Measurement range humidity	0% RH … 100% RH

The product conforms with the provisions of EU directives.

2. Installation and commissioning

Installation, testing, operational start-up and troubleshooting should only be performed by an authorised electrician.

CAUTION!
Live voltage!
There are unprotected live components inside the device.

- Inspect the device for damage before installation. Only put undamaged devices into operation.
- Comply with the locally applicable directives, regulations and provisions for electrical installation.
- Immediately take the device or system out of service and secure it against unintentional switch-on if risk-free operation is no longer guaranteed.

Use the device exclusively for building automation and observe the operating instructions. Improper use, modifications to the device or failure to observe the operating instructions will invalidate any warranty or guarantee claims.
Operate the device only as a fixed-site installation, i.e. only in assembled condition and after conclusion of all installation and operational start-up tasks, and only in the surroundings designated for it.
Elsner Elektronik is not liable for any changes in norms and standards which may occur after publication of these operating instructions.

2.1. Location

The sensor is designed for surface mounting. When selecting an installation location, please ensure that the measurement results are affected as little as possible by external influences. Possible sources of interference include:

- Direct sunlight
- Drafts from windows and doors
- Warming or cooling of the building structure on which the sensor is mounted, e.g. due to sunlight, heating or cold water pipes
- Connection lines which lead from warmer or colder areas to the sensor

Temperature variations from such sources of interference must be corrected in the ETS in order to ensure the specified accuracy of the sensor (temperature offset).

For outdoor installation it must be ensured that a 60 cm gap is left below the sensor in order to prevent it from being snowed during snowfall.

The sensor must be mounted vertically. The measurement probe and the cable outlet must point downwards.

2.2. Notes on mounting and commissioning

Do not open the temperature sensor if penetration of water (rain) is likely: Only a couple of drops could damage the electronic.

Do not dip the measuring tip (metal sleeve with sensor) in water.

Avoid the bedewing of the device. For critical applications, where condensate formation is expectable, please ask Elsner Elektronik for customized solutions.

2.3. Mounting and connection

2.3.1. Layout of casing and pcb

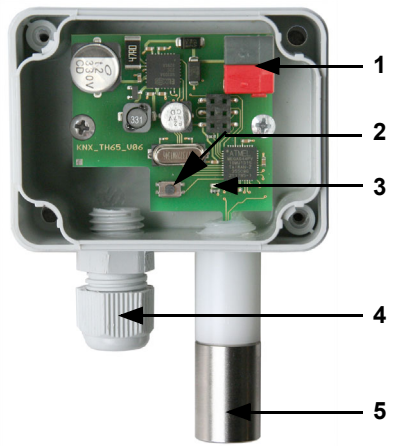

Fig. 1 Opened casing, board
1 KNX terminal +/-
2 Programming button for teaching the device
3 Programming LED
4 Cable entry with threaded joint
5 Sensor tip

Fig. 2 Rear view with dimensioning of openings for mounting

2.3.2. Connection of the sensor

Remove the screwed on cover. Lead the KNX bus connection cable through the cable entry on the bottom of the casing and connect the bus +/- to the terminal provided for this purpose. Screw the cover back on.

After the bus voltage has been applied, the device will enter an initialisation phase lasting a few seconds. During this phase no information can be received or sent via the bus.

3. Addressing of the device at the bus

The device is supplied with the bus address 15.15.255. You can program another address into the ETS by overwriting the 15.15.255 address or by teaching via the programming button.

4. Maintenance

Always isolate the device from the voltage supply for servicing and cleaning.

The device must regularly be checked for dirt twice a year and cleaned if necessary. In case of severe dirt, the sensor may not work properly anymore.

ATTENTION
The device can be damaged if significant volumes of water penetrate the housing.

- Do not clean with high pressure cleaners or steam jets.

5. Disposal

After use, the device must be disposed of in accordance with the legal regulations. Do not dispose of it with the household waste!

6. Transfer protocol

6.1. List of all communication objects

Abbreviation flags:

C Communication
R Read
W Write
T Transfer
U Update

No.	Name	Function	DPT	Flags
0	Outside temperature reading	Input	9,001	C W
1	Inside temperature reading	Output	9,001	C R T
2	Overall temperature reading	Output	9,001	C R T
3	Min./max. temperature value request	Input	1,017	C W
4	Minimum temperature reading	Output	9,001	C R T
5	Maximum temperature reading	Output	9,001	C R T
6	Reset min./max. temperature value	Input	1,017	C W
7	Temperature sensor defect	Output	1,001	C R T
9	Temp. threshold value 1: Absolute value	Input / Output	9,001	C R W T U
10	Temp. threshold value 1: (1:+ | 0:-)	Input	1,006	C W
11	Temp. threshold value 1: Switching output	Output	1,001	C R T
12	Temp. threshold value 1: Switching output block	Input	1,006	C W
13	Temp. threshold value 2: Absolute value	Input / Output	9,001	C R W T U
14	Temp. threshold value 2: (1:+ | 0:-)	Input	1,006	C W
15	Temp. threshold value 2: Switching output	Output	1,001	C R T
16	Temp. threshold value 2: Switching output block	Input	1,006	C W
17	Temp. threshold value 3: Absolute value	Input / Output	9,001	C R W T U
18	Temp. threshold value 3: (1:+ | 0:-)	Input	1,006	C W
19	Temp. threshold value 3: Switching output	Output	1,001	C R T

No.	Name	Function	DPT	Flags
20	Temp. threshold value 3: Switching output block	Input	1,006	C W
21	Temp. threshold value 4: Absolute value	Input / Output	9,001	C R W T U
22	Temp. threshold value 4: (1:+ | 0:-)	Input	1,006	C W
23	Temp. threshold value 4: Switching output	Output	1,001	C R T
24	Temp. threshold value 4: Switching output block	Input	1,006	C W
25	Temp. controller: Switching object (0:Heating | 1:Cooling)	Input	1,002	C W
26	Temp. controller: Current setpoint	Output	9,001	C R T
27	Temp. controller: Blocking object	Input	1,006	C W
28	Temp. controller: Setpoint, daytime Heating	Input / Output	9,001	C R W T U
29	Temp. controller: Setpoint, daytime Heating (1:+ | 0:-)	Input	1,002	C W
30	Temp. controller: Setpoint, daytime Cooling	Input / Output	9,001	C R W T U
31	Temp. controller: Setpoint, daytime Cooling (1:+ | 0:-)	Input	1,002	C W
32	Temp. controller: Control variable, heating (level 1)	Output	5,001	C R T
33	Temp. controller: Control variable, heating (level 2)	Output	5,001	C R T
34	Temp. controller: Control variable, heating (level 2)	Output	1,001	C R T
35	Temp. controller: Control variable, cooling (Level 1)	Output	5,001	C R T
36	Temp. controller: Control variable, cooling (Level 2)	Output	5,001	C R T
37	Temp. controller: Control variable, cooling (Level 2)	Output	1,001	C R T
38	Temp. controller: Night-time reduction activation	Input	1,003	C W
39	Temp. controller: Heating setpoint, night	Input / Output	9,001	C R W T U
40	Temp. controller: Heating setpoint, night (1:+ | 0:-)	Input	1,002	C W
41	Temp. controller: Cooling setpoint, night	Input / Output	9,001	C R W T U

No.	Name	Function	DPT	Flags
42	Temp. controller: Cooling setpoint, night (1:+ | 0:-)	Input	1,002	C W
43	Temp. controller: Heating 1 (1=ON | 0=OFF)	Output	1,001	C R T
44	Temp. controller: Heating 2 (1=ON | 0=OFF)	Output	1,001	C R T
45	Temp. controller: Cooling 1 status (1=ON | 0=OFF)	Output	1,001	C R T
46	Temp. controller: Cooling 2 status (1=ON | 0=OFF)	Output	1,001	C R T
47	Temp. controller: Window status (0: CLOSED | 1: OPEN)	Input	1,019	C W
48	Outside humidity reading	Input	9,007	C W
49	Inside humidity reading	Output	9,007	C R T
50	Overall humidity reading	Output	9,007	C R T
51	Min./max. humidity value request	Input	1,017	C W
52	Minimum humidity reading	Output	9,007	C R T
53	Maximum humidity reading	Output	9,007	C R T
54	Reset min./max. humidity value	Input	1,017	C W
55	Humidity threshold value 1: Absolute value	Input / Output	9,007	C R W T U
56	Humidity threshold value 1: (1:+ | 0:-)	Input	1,006	C W
57	Humidity threshold value 1: Switching output	Output	1,001	C R T
58	Humidity threshold value 1: Switching output block	Input	1,006	C W
59	Humidity threshold value 2: Absolute value	Input / Output	9,007	C R W T U
60	Humidity threshold value 2: (1:+ | 0:-)	Input	1,006	C W
61	Humidity threshold value 2: Switching output	Output	1,001	C R T
62	Humidity threshold value 2: Switching output block	Input	1,006	C W
63	Humidity controller: Blocking object	Input	1,006	C W
64	Humidity controller: Setpoint	Input / Output	9,007	C R W T U
65	Humidity controller: Setpoint (1:+ | 0:-)	Input	1,006	C W

No.	Name	Function	DPT	Flags
66	Humidity controller: Control variable dehumidification (stage 1)	Output	5,001	C R T
67	Humidity controller: Control variable Dehumidification stage 2	Output	5,001	C R T
68	Humidity controller: Control variable humidification	Output	5,001	C R T
69	Dewpoint	Output	9,001	C R T
70	Coolant temp.: Threshold value	Output	9,001	C R W T U
71	Coolant temp.: Actual value	Input	9,001	C W
72	Coolant temp.: Offset change (1:+ | 0:-)	Input	1,006	C W
73	Coolant temp.: Switching output	Output	1,001	C R T
74	Coolant temp.: Switching output block	Input	1,006	C W
75	Absolute humidity [g/kg]	Output	14,005	C R T
76	Absolute humidity [g/m³]	Output	14,005	C R T
77	Ambient climate status: 1 = comfortable | 0 = uncomfortable	Output	1,006	C R T
78	Logic input 1	Input	1,006	C W
79	Logic input 2	Input	1,006	C W
80	Logic input 3	Input	1,006	C W
81	Logic input 4	Input	1,006	C W
82	Logic input 5	Input	1,006	C W
83	Logic input 6	Input	1,006	C W
84	Logic input 7	Input	1,006	C W
85	Logic input 8	Input	1,006	C W
86	AND logic 1: 1-bit	output	1,001	C R T
87	AND logic 1: 8-bit output A	Output	5,010	C R T
88	AND logic 1: 8-bit output B	Output	5,010	C R T
89	AND logic 2: 1-bit	Output	1,001	C R T
90	AND logic 2: 8-bit output A	Output	5,010	C R T
91	AND logic 2: 8-bit output B	Output	5,010	C R T
92	AND logic 3: 1-bit	output	1,001	C R T
93	AND logic 3: 8-bit output A	Output	5,010	C R T
94	AND logic 3: 8-bit output B	Output	5,010	C R T
95	AND logic 4: 1-bit	output	1,001	C R T

No.	Name	Function	DPT	Flags
96	AND logic 4: 8-bit output A	Output	5,010	C R T
97	AND logic 4: 8-bit output B	Output	5,010	C R T
98	OR logic 1: 1-bit	output	1,001	C R T
99	OR logic 1: 8-bit output A	Output	5,010	C R T
100	OR logic 1: 8-bit output B	Output	5,010	C R T
101	OR logic 2: 1-bit	output	1,001	C R T
102	OR logic 2: 8-bit output A	Output	5,010	C R T
103	OR logic 2: 8-bit output B	Output	5,010	C R T
104	OR logic 3: 1-bit	output	1,001	C R T
105	OR logic 3: 8-bit output A	Output	5,010	C R T
106	OR logic 3: 8-bit output B	Output	5,010	C R T
107	OR logic 4: 1-bit	output	1,001	C R T
108	OR logic 4: 8-bit output A	Output	5,010	C R T
109	OR logic 4: 8-bit output B	Output	5,010	C R T
110	Software version	Output	217,001	C R T

7. Setting parameters

7.1. Behaviour on power failure/ restoration of power

Behaviour following a failure of the bus power supply:

The device sends nothing.

Behaviour on bus restoration of power and following programming or reset:

The device sends all outputs according to their send behaviour set in the parameters with the delays established in the "General settings" parameter block.

7.2. General settings

Since the application is used for several devices, the first settings are device-specific. Please ensure that the following settings are selected for the **KNX TH65-AP**

Use parameters and objects for the humidity sensor	**Yes**
Type of logic	**Logic for temperature and humidity sensor**
Use parameters and objects for display	**No**

Set the basic data transfer characteristics and select whether or not malfunction objects should be sent.

Send delays after power-up and programming for:	
Readings	5 s • ... • 2 h
Threshold values and switching outputs	5 s • ... • 2 h
Setpoints and control variables	5 s • ... 2 h; 10 s
Logic outputs	5 s • ... 2 h; 10 s
Maximum message rate	• 1 message per second • ... • 5 messages per second • ... • 20 messages per second
Use malfunction object	No • Yes

7.3. Measured values: Temperature, humidity

The settings options for temperature and readings are the same.

Use **Offsets** to adjust the readings to be sent.

Temperature: Offset in 0.1°C *Humidity*: Offset in % RH	-50…50; 0 -10...10; 0

The unit can calculate a **mixed value** from its own reading and an external value. Set the mixed value calculation if desired.

Use external reading	Yes • No
Ext. Measured value portion of the total reading	5% • 10% • ... • 50% • ... • 100%
Send internal and total reading	• do not send • send periodically • send on change • send on change and periodically
On change of *(if sent on change)*	2% • 5% • 10% • 25% • 50%
Send cycle *(if sent periodically)*	5 s • ... • 2 h

Note: if an external portion is used, all of the following settings (threshold values, etc.) are related to the overall reading!

The **minimum and maximum readings** can be saved and sent to the bus. Use the "Reset temperature (and/or humidity) min./max. value" objects to reset the values to the current readings.

Use min. and max. values	Yes • No

The values are not retained after a reset.

7.4. Threshold values: Temperature, humidity

Activate the threshold values that you want to use here. The **KNX TH65-AP thermal hygrometer** provides four threshold values for temperature and two threshold values for air humidity.

Use threshold value 1/2/3/4	Yes • No

7.4.1. Threshold value 1, 2, 3, 4: Temperature, humidity

The settings options for temperature and threshold values are the same.

Threshold value

Set the threshold values directly in the application program using parameters, or define them via the bus using a communication object.

Threshold value setpoint using parameter:

Set the threshold values and hysteresis directly.

Threshold value setpoint using	**Parameter** • Communication objects
Temperature: Threshold value in 0.1°C *Humidity:* Threshold value in % RH	-300 … 800; 200 0...100; 70
Hysteresis of the threshold value in %	0 … 50; 20

Threshold value setpoint using a communication object:

Beforehand, enter how the threshold value will be received from the bus. Basically, a new value can be received, or simply a command to increase or decrease.

During initial commissioning, a threshold value must be defined which will be valid until the first call with a new threshold value. For units which have already been taken into service, the last communicated threshold value can be used. Basically, a temperature range is given in which the threshold value can be changed (object value limit).

A set threshold value will be retained until a new value or a change is transferred. The current value is saved in EEPROM, so that this is retained in the event of a power supply failure and will be available once the power supply is restored.

Threshold value setpoint using	Parameter • **Communication objects**
The last communicated value should	• not be retained • be retained after power restoration • be retained after power restoration and programming
Start threshold value *Temperature:* in 0.1°C *Humidity:* in % RH valid until first call	-300 … 800; 200 0...100; 70
Type of threshold value change	Absolute value • Increase/decrease
Interval *(upon increase/decrease change)*	*Temperature:* 0.1°C • ... • 1°C • ... • 5°C *Humidity:* 1% • 2% • 5% • 10%
Hysteresis of the threshold value in %	0 … 50; 20

Switching output

Set the behaviour of the switching output when a threshold value is exceeded/undercut. The output switching delay can be set using objects or directly as a parameter.

When the following conditions apply, the output is (TV = Threshold value)	• TV above = 1 | TV - Hyst. below = 0 • TV above = 0 | TV - Hyst. below = 1 • TV below = 1 |TV + hysteresis above = 0 • TV below = 0 |TV + hysteresis above = 1
Switching delay from 0 to 1	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching delay from 1 to 0	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h

Switching output sends	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Send switching output in the cycle of *(is sent only if "periodically" is selected)*	5 s • 10 s • 30 s... • 2 h

Blocking

The switching output can be blocked using an object. Define specifications here for the behaviour of the output when blocked.

Use switching output block	No • Yes
Analysis of the blocking object	• At value 1: block | At value 0: release • At value 0: block | At value 1: release
Blocking object value before first call	0 • 1
Switching output behaviour	
On blocking	• Do not send message • send 0 • send 1
On release (with 2 seconds release delay)	[Dependent on the "Switching output sends" setting]

The behaviour of the switching output on release is dependent on the value of the parameter "Switching output sends" (see "Switching output")

Switching output sends on change	• Do not send message • Send switching output status
Switching output sends on change to 1	• Do not send message • if switching output = 1 ➔ send 1
Switching output sends on change to 0	• Do not send message • if switching output = 0 ➔ send 0
Switching output sends on change and periodically	Send switching output status
Switching output sends on change to 1 and periodically	if switching output = 1 ➔ send 1
Switching output sends on change to 0 and periodically	if switching output = 0 ➔ send 0

7.5. Temperature PI control

Activate the control if you want to use it.

Use control	No • Yes

General control

Define the **type of control**. Heating and/or cooling may be controlled in two levels.

Type of control	• Single level heating • Dual-level heating • Single-level cooling • Dual-level cooling • Single-level heating + single-level cooling • Dual-level heating + single-level cooling • Dual-level heating + dual-level cooling

Then configure a temperature control **block** using the blocking object.

Behaviour of the blocking object with value	• 1 = Blocking regulation | 0 = Releasing regulation • 0 = Blocking regulation | 1 = Releasing regulation

Specify when the current control variables are to be sent to the bus. Periodic transmission is safer if a message does not reach a recipient. You may also set up periodical monitoring by the actuator with this setting.

Send control variable	• on change • on change and periodically
Send cycle *(is sent only if "periodically" is selected)*	5 s ... 2 h

The status object reports the current status of the control variable (0% = OFF, >0% = ON) and may for example be used for visualisation, or to switch off the heating pump as soon as the heating is switched off.

Send status object(s)	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Send cycle *(is sent only if "periodically" is selected)*	5 s ... 2 h

Set the way in which switching from heating to cooling is to take place.

Switching between heating and cooling	• By means of dead zone • By means of switching object
Dead zone between heating and cooling (in 0.1°C) *(when switched by means of a "dead zone")*	1 ... 100; 50
Value of the switching object before first call *(when switched by means of a switching object)*	0 • 1

If switching occurs by means of a dead zone, cooling control starts at current temperature >= setpoint + dead zone

Controller setpoint

The setpoint may be adjusted via parameters or communication objects.

Specified setpoint using	Parameter • Communication object

If the setpoint is set via parameters:

Set the setpoint for heating and/or cooling.

Specified setpoint using	**Parameter**
Setpoint (heating) in 0.1°C	-300 ... 800
Setpoint (cooling) in 0.1°C	-300 ... 800

If the setpoint is set via communication object:

A starting setpoint value is defined as well as a temperature range in which the setpoint value may be changed.

Specified setpoint using	**Communication object**
The last communicated value should	• not be retained • be retained after power restoration • be retained after power restoration and programming (not to be used for first commissioning)
Start setpoint (heating) in 0.1°C valid until first call *(only if the last retained value is "not" retained, or retained "after power restoration")*	-300 ... 800; 200
Object value limit (min) in 0.1°C	-300 ... 800; 140
Object value limit (max) in 0.1°C	-300 ... 800; 250
Start setpoint (cooling) in 0.1°C valid until first call *(only if the last retained value is "not" retained, or retained "after power restoration")*	-300 ... 800; 200
Object value limit (min) in 0.1°C	-300 ... 800; 140
Object value limit (max) in 0.1°C	-300 ... 800; 250
Type of setpoint change	• Absolute value • Increase / Decrease
Interval *(only when "increasing/decreasing")*	0.1°C • 0.2°C • 0.3°C • 0.4°C • 0.5°C • 1°C • 2°C • 3°C • 4°C • 5°C

7.5.1. Heating control level 1/2

If a heating control mode is configured, one or two setting sections for the heating levels are displayed.

In the 1st level, heating is controlled by a PI control, which allows to either enter control parameters or select predetermined applications.

In the 2nd level (therefore only in case of 2-level heating), heating is controlled via a PI or a 2-point-control.
In level 2, the setpoint difference between the two levels must also be specified, i.e. below which setpoint deviation the second level is added.

Setpoint difference between 1st and 2nd level (in 0.1°C) *(for level 2)*	0...100; 40
Control type *(for level 2, no common control variables)*	• 2-point-control • PI control
Control variable is a *(for level 2 with 2-point controlling, no common control variables)*	• 1 bit object • 8 bit object

PI control with control parameters:

This setting allows individual input of the parameters for PI control.

Control type	• **PI control**
Setting of the controller by	• **Controller parameter** • specified applications

Specify the deviation from the setpoint value at which the maximum control variable value is reached, i.e. the point at which maximum heating power is activated.
The reset time shows how quickly the controller responds to deviations from the setpoint value. In case of a short reset time, the control responds with a fast increase of the control variable. In case of a long reset time, the control responds somewhat less urgently and needs longer until the necessary control variable for the setpoint value deviation is reached.
You should set the time appropriate to the heating system at this point (observe manufacturer's instructions).

Maximum control variable is reached at setpoint/actual difference of	1°C • 2°C • 3°C • 4°C • 5 °C
Reset time in min.	1...255; 30

Now specify what should be sent when the control is blocked. Set a value greater 0 (=OFF) to receive a basic heating level, e.g. for floor heating.
On release, the control variable follows the rule again.

When blocked, the control variable shall	• not be sent • send a specific value
Value (in %) *(if a value is sent)*	0...100

PI control with predetermined application:

This setting provides fixed parameters for frequent applications.

Control type	• **PI control**
Setting of the controller by	• Controller parameter • **specified applications**
Application	• Warm water heating • Floor heating • Convection unit • Electric heating
Maximum control variable is reached at setpoint/actual difference of (in °C)	Warm water heating: 5 Floor heating: 5 Convection unit: 4 Electric heating: 4
Reset time (in min.)	Warm water heating: 150 Floor heating: 240 Convection unit: 90 Electric heating: 100

Now specify what should be sent when the control is blocked. Set a value greater 0 (=OFF) to receive a basic heating level, e.g. for floor heating.
On release, the control variable follows the rule again.

When blocked, the control variable shall	• not be sent • send a specific value
Value (in %) *(if a value is sent)*	0...100

2-point-control (only level 2):

2-point-control is used for systems which are only set to ON or OFF.

Control type *(is determined at a higher level for common control variables)*	• **2-point-control**

Enter the hysteresis that prevents frequent on/off switching of temperatures in the threshold range.

Hysteresis in 0.1°C	0...100; 20

If separate control variables are used, select whether the control variable of the 2nd level is a 1 bit object (on/off) or an 8 bit object (on with percentage/off).

Control variable is a	• 1 bit object • 8 bit object
Value (in %) *(for 8 bit object)*	0...100

Now specify what should be sent when the control is blocked. Set a value greater 0 (=OFF) to receive a basic heating level, e.g. for floor heating. On release, the control variable follows the rule again.

When blocked, the control variable shall	• not be sent • send a specific value
Value (in %) *only if a value is sent*	0...100

7.5.2. Cooling control level 1/2

If a cooling control mode is configured, one or two setting sections for the cooling levels are displayed.

In the 1st level, cooling is controlled by a PI control in which either control parameters can be entered or predetermined applications can be selected.

In the 2nd level (therefore only for 2-level cooling), cooling is controlled via a PI or a 2-point-control.
In level 2, the setpoint deviation between the two levels must also be specified, i.e. above which setpoint value deviation the second level is added.

Setpoint difference between 1st and 2nd level (in 0.1°C) *(for level 2)*	0...100; 40
Control type *(for level 2, no common control variables)*	• 2-point-control • PI control
Control variable is a *(for level 2 with 2-point controlling, no common control variables)*	• 1 bit object • 8 bit object

PI control with control parameters:

This setting allows individual input of the parameters for PI control.

Control type	**• PI control**
Setting of the controller by	**• Controller parameter** • specified applications

Specify the deviation from the setpoint value which reaches maximum variable value, i.e. the point at which maximum cooling power is activated.
The reset time shows how quickly the controller responds to deviations from the setpoint value. In case of a short reset time, the control responds with a fast increase of the control variable. In case of a long reset time, the control responds somewhat less urgently and needs longer until the necessary control variable for the setpoint value deviation is reached. You should set the time appropriate to the cooling system at this point (observe manufacturer's instructions).

Maximum control variable is reached at setpoint/actual difference of	1°C • 2°C • 3°C • 4°C • 5 °C
Reset time in min.	1...255; 30

Now specify what should be sent when the control is blocked.
On release, the control variable follows the rule again.

When blocked, the control variable shall	• not be sent • send a specific value
Value (in %) *(if a value is sent)*	0...100

PI control with predetermined application:

This setting provides fixed parameters for a cooling ceiling

Control type	• **PI control**
Setting of the controller by	• Controller parameter • **specified applications**
Application	• Cooling ceiling
Maximum control variable is reached at setpoint/actual difference of (in °C)	Cooling ceiling: 5
Reset time (in min.)	Cooling ceiling: 30

Now specify what should be sent when the control is blocked.
On release, the control variable follows the rule again.

When blocked, the control variable shall	• not be sent • send a specific value
Value (in %) *(if a value is sent)*	0...100

2-point-control (only level 2):

2-point-control is used for systems which are only set to ON or OFF.

Control type *is determined at a higher level for common variables*	• **2-point-control**

Enter the hysteresis that prevents frequent on/off switching of temperatures in the threshold range.

Hysteresis (in 0.1°C)	0...100; 20

If separate control variables are used, select whether the control variable of the 2nd level is a 1 bit object (on/off) or an 8 bit object (on with percentage/off).

Control variable is a	• 1 bit object • 8 bit object
Value (in %) *(for 8 bit object)*	0...100

Now specify what should be sent when the control is blocked.
On release, the control variable follows the rule again.

When blocked, the control variable shall	• not be sent • send a specific value
Value (in %) *(if a value is sent)*	0...100

Night reduction

Use night reduction	No • Yes

Decide when night reduction is to be activated.

Night reduction for object value	• 1 = active | 0 = inactive • 0 = active | 1 = inactive
Activation object value before first call	0 • 1
Specified setpoint using	Parameter • Communication object

If the setpoint is set via parameters:

Set the setpoint for heating and/or cooling.

Specified setpoint using	**Parameter**
Setpoint heating in 0.1°C *(if the heating regulator is being used)*	-300 ... 800; 180
Setpoint cooling in 0.1°C *(if the cooling regulator is being used)*	-300 ... 800; 260

If the setpoint is set via communication object:

A starting setpoint value is defined as well as a temperature range in which the setpoint value may be changed.

Specified setpoint using	**Communication object**
The last communicated value should	• not be retained • be retained after power restoration • be retained after power restoration and programming (not to be used for first commissioning)
Start setpoint heating in 0.1°C valid until first call *(if the heating regulator is being used and only if the last retained value is "not" retained, or retained "after power restoration")*	-300 ... 800
Limitation of object value H(min)\r\n in 0.1°C	-300 ... 800
Limitation of object value H(max)\r\n in 0.1°C	-300 ... 800

Start setpoint cooling in 0.1°C valid until first call *(if the cooling regulator is being used and only if the last retained value is "not" retained, or retained "after power restoration")*	-300 ... 800
Limitation of object value C(min)\r\n in 0.1°C	-300 ... 800
Limitation of object value C(max)\r\n in 0.1°C	-300 ... 800
Type of setpoint change	• Absolute value • Increase / Decrease
Interval *(only when "increasing/decreasing")*	0.1°C • 0.2°C • 0.3°C • 0.4°C • 0.5°C • 1°C • 2°C • 3°C • 4°C • 5°C

Frost/heat protection

Use frost/heat protection	No • Yes

Set the setpoint for heating (frost protection) and/or cooling (heat protection) and adjust the activation delay. The delay allows you to leave the building before the controls switch to frost/heat protection mode.

Setpoint heating in 0.1°C *(if the heating regulator is being used)*	-300 ... 800
Activation delay (after opening windows)	none • 1 s ... 2 h
Setpoint cooling in 0.1°C *(if the cooling regulator is being used)*	-300 ... 800
Activation delay (after opening windows)	none • 1 s ... 2 h
Window status before first call	Closed • Open

7.6. Humidity PI control

If you activate humidity control, you can use the following settings to define control type, setpoints, and humidification and dehumidification.

Use controller	No • Yes

General control

KNX TH65-AP thermal hygrometer can be used to control one- or two-stage dehumidification or combined humidification/dehumidification.

Type of control	• One-stage dehumidification • Two-stage dehumidification • Humidification and dehumidification

Configure a block for the humidity control using the blocking object.

Behaviour of the blocking object with value	• 1 = Block | 0 = release • 0 = block | 1 = release
Blocking object value before first call	0 • 1

Controller setpoint

Specified setpoint using	Parameter • Communication object

If the setpoint is set via parameters:

Set the setpoint for humidity.

Specified setpoint using	**Parameter**
Setpoint in %	0 ... 100

If the setpoint is set via communication object:

A starting setpoint is defined as well as a range in which the setpoint may vary.

Specified setpoint using	**Communication object**
The last communicated value should	• not be retained • be retained after power restoration • be retained after power restoration and programming (not to be used for first commissioning)
Start setpoint in % valid until first call *(only if the last retained value is "not" retained, or retained "after power restoration")*	0 ... 100
Type of setpoint change	• Absolute value • Increase / Decrease
Interval *(only when "increasing/decreasing")*	0.1°C • 0.2°C • 0.3°C • 0.4°C • 0.5°C • 1°C • 2°C • 3°C • 4°C • 5°C

In "Humidification and dehumidification" control mode, a dead zone is specified so that no direct changeover switching between humidification and dehumidification is possible.

Dead zone between humidification and dehumidification in % *(only if both humidification and dehumidification are used)*	0...50; 10

Humidification starts when the relative air humidity is below or equal to the setpoint - dead zone value.

Dehumidification and/or humidification

Depending on the control mode, settings sections for humidification and dehumidification will appear (stages 1/2).

For two-stage dehumidification, the setpoint difference between the two stages must be defined, i.e. at which setpoint undercut the second stage is then added.

Setpoint difference between levels 1 and 2 in % *(for Level 2 only)*	0...50; 10

Determine the deviation from the setpoint at which the maximum variable value is reached, i.e. the point at which maximum output is used.
The reset time shows how quickly the controller responds to deviations from the setpoint. In case of a short reset time, the control responds with a fast increase of the control variable. In case of a long reset time, the control responds somewhat less urgently and needs longer until the necessary control variable for the setpoint deviation is reached.
You should set the time appropriate for the humidification/dehumidification system at this point (note manufacturer instructions).

Maximum control variable is reached at target/actual difference of %	1...50; 5
Reset time in minutes	1...255; 3

Now specify what should be sent when the control is blocked.
On release, the control variable follows the rule again.

When blocked, the control variable should	• not be sent • send a specific value
Value in % (*only if a value is sent)*	0...100

7.7. Dewpoint

The **KNX TH65-AP thermal hygrometer** calculates the dewpoint and outputs the value to the bus.

Send pattern	• never • periodically • on change • on change and periodically
On change of *(if sent on change)*	0,1°C • 0,2°C • 0,5°C • 1,0°C • 2,0°C • 5,0°C
Send cycle *(if sent periodically)*	5 s • 10 s • 30 s • 1 min • ... • 2 h

Activate coolant temperature monitoring if required. The menu for further monitoring settings is then displayed.

Use coolant temperature monitoring	No • Yes

7.7.1. Coolant temp. monitoring

A threshold value can be set for the coolant temperature based on the current dew-point (offset/deviation). The switching output of the coolant temperature monitoring system can provide a warning prior to any build-up of condensation in the system, and/or activate appropriate countermeasures.

Threshold value

Threshold value = dewpoint+ offset

Set the cases in which **offsets** received are to be kept per object. Please note that the setting "After power restoration and programming" should not be used for the initial start-up, as the factory settings are always used until the first call (setting via objects is ignored).

The last set offset should	• not be retained • be retained after power restoration • be retained after power restoration and programming

During initial commissioning, an **offset** must be defined which will be valid until the first call with a new offset. For units which have already been taken into service, the last communicated offset can be used.

A set offset will be retained until a new value or a change is transferred. The current value is saved in EEPROM, so that this is retained in the event of a power supply failure and will be available once the power supply is restored.

Start offset in °C valid until first call	0...20; 3
Interval for offset change using communication object	0.1°C • 0.2°C • 0.3°C • 0.4°C • 0.5°C • 1°C • 2°C • 3°C • 4°C • 5°C
Hysteresis of the threshold value in %	0 ... 50; 20
Threshold value	• do not send • send periodically • send on change • send on change and periodically
On change of *(if sent on change)*	2% • 5% • 10% • 25% • 50%
Send periodically every *(if sent periodically)*	5 s • 10 s • 30 s • 1 min • ... • 2 h

Switching output

When the following conditions apply, the output is (TV = Threshold value)	• TV above = 1 | TV - Hyst. below = 0 • TV above = 0 | TV - Hyst. below = 1 • TV below = 1 |TV + hysteresis above = 0 • TV below = 0 |TV + hysteresis above = 1
Switching delay from 0 to 1	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching delay from 1 to 0	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching output sends	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Send periodically every *(if sent periodically)*	5 s • 10 s • 30 s... • 2 h

Blocking

The switching output can be blocked using an object. Define specifications here for the behaviour of the output when blocked.

Use switching output block	No • Yes
Analysis of the blocking object	• At value 1: block | At value 0: release • At value 0: block | At value 1: release
Blocking object value before first call	0 • 1
Switching output behaviour	
On blocking	• Do not send message • send 0 • send 1
On release (with 2 seconds release delay)	[Dependent on the "Switching output sends" setting]

The behaviour of the switching output on release is dependent on the value of the parameter "Switching output sends" (see "Switching output")

Switching output sends on change	• Do not send message • Send switching output status
Switching output sends on change to 1	• Do not send message • if switching output = 1 ➔ send 1
Switching output sends on change to 0	• Do not send message • if switching output = 0 ➔ send 0
Switching output sends on change and periodically	Send switching output status
Switching output sends on change to 1 and periodically	if switching output = 1 ➔ send 1
Switching output sends on change to 0 and periodically	if switching output = 0 ➔ send 0

7.8. Absolute humidity

The absolute humidity value for the air is determined from the **KNX TH65-AP** and can be output to the bus.

Use absolute humidity	No • Yes

Send pattern	• never • periodically • on change • on change and periodically
On change of *(if sent on change)*	2% • 5% • 10% • 25% • 50%
Send periodically every *(if sent periodically)*	5 s • 10 s • 30 s... • 2 h

Unit object 65: g water / kg air
Unit object 66: g water / m3 air

7.9. Comfort field

The **KNX TH65-AP thermal hygrometer** can send a message to the bus if the limits of the comfort field are exceeded. In this way, it is for example possible to monitor compliance with DIN 1946 (standard values) or even to define your own comfort field.

Use comfort field	No • Yes

Set the send pattern.

Send pattern retained	• never • periodically • on change • on change and periodically
Send periodically every *(if sent periodically)*	5 s • 10 s • 30 s... • 2 h

Define the comfort field by setting minimum and maximum values for temperature and humidity. The set standard values correspond to DIN 1946.

Maximum temperature in °C (Standard 26°C)	25 ... 40; 26
Minimum temperature in °C (Standard 20°C)	10 ... 21; 20
Maximum relative humidity in % *(*Standard 65%)	52 ... 90; 65
Minimum relative humidity in % (Standard 30%)	10 ... 43; 30
Maximum absolute humidity in 0.1 g/kg (Standard 115 g/kg)	50 ... 200; 115

Temperature hysteresis: 1°C
Relative humidity hysteresis: 2% RH
Absolute humidity hysteresis: 2 g/kg

7.10. Logic

The device provides 8 communication objects for logic inputs, four AND and four OR logic gates.

Activate the communication objects of the logic inputs.

Logici input communication objects	do not release • release

Activate the required logic outputs.

AND logic

AND logic 1	not active • active
AND logic ...	not active • active
AND logic 4	not active • active

OR logic

OR logic 1	not active • active
OR logic ...	not active • active
OR logic 4	not active • active

7.10.1. AND logic 1-4 and OR logic outputs 1-4

The same setting options are available for AND and OR logic.

Each logic output may transmit one 1-bit or two 8-bit objects. Determine what the out put should send if logic = 1 and = 0.

1. / 2. / 3. / 4. Input	• do not use - Communication object logic inputs 1...8 - Communication object logic inputs 1...8 inverted • all switching events that the device provides (see the chapter *Connection inputs for AND or OR logic*)
Logic output sends	• never sends • sends one 1-bit object • sends two 8-bit objects

Set the starting values for various situations:
If the **logic output sends one 1-bit object** :

If logic = 1 ==> object value	1 • 0
If logic = 0 ==> object value	1 • 0

If the **logic output sends two 8-bit objects**:

If logic = 1 ==> Object A value	0 ... 255; 127
if logic = 1 ==> object B value	0 ... 255
If logic = 0 ==> Object A value	0 ... 255; 127
If logic = 0 ==> Object B value	0 ... 255

Set the output send pattern.

Communication object logic X sends	• on change of logic • on change of logic to 1 • on change of logic to 0 • on change of logic and periodically • on change of logic to 1 and periodically • on change of logic to 0 and periodically
Send periodically every *(if sent periodically)*	5 s • 10 s • 30 s... • 2 h

7.10.2. AND logic connection inputs

Do not use
Communication object logic input 1
Communication object logic input 1 inverted
Communication object logic input 2
Communication object logic input 2 inverted
Communication object logic input 3
Communication object logic input 3 inverted
Communication object logic input 4
Communication object logic input 4 inverted
Communication object logic input 5
Communication object logic input 5 inverted
Communication object logic input 6
Communication object logic input 6 inverted
Communication object logic input 7
Communication object logic input 7 inverted
Communication object logic input 8
Communication object logic input 8 inverted
Temperature threshold value 1
Temperature threshold value 1 inverted:
Temperature threshold value 2

Temperature threshold value 2 inverted:
Temperature threshold value 3
Temperature threshold value 3 inverted:
Temperature threshold value 4
Temperature threshold value 4 inverted:
Humidity threshold value 1
Humidity threshold value 1 inverted:
Humidity threshold value 2
Humidity threshold value 2 inverted:
Coolant temperature threshold value
Coolant temperature threshold value inverted
Room temperature is comfortable
Room temperature is uncomfortable
Sensor malfunction
Sensor malfunction inverted

7.10.3. OR logic connection inputs

The OR logic connection inputs are the same as those for the AND logic. In addition the following inputs are available for the OR logic:

AND logic output 1
AND logic output 1 inverted
AND logic output 2
AND logic output 2 inverted
AND logic output 3
AND logic output 3 inverted
AND logic output 4
AND logic output 4 inverted

Questions about the product?

You can reach the technical service of Elsner Elektronik under
Tel. +49 (0) 70 33 / 30 945-250 or
service@elsner-elektronik.de

We need the following information to process your service request:

- Type of appliance (model name or item number)
- Description of the problem
- Serial number or software version
- Source of supply (dealer/installer who bought the device from Elsner Elektronik)

For questions about KNX functions:

- Version of the device application
- ETS version used for the project

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