KNX TH65-AP

Thermo-Hygrometer

elsner®
elektronik

Installation and Adjustment

1. Description

The Temperature and Humidity Sensor **KNX TH65-AP** measures temperature and humidity 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, 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)
- **7 switching outputs** with adjustable threshold values (Threshold values can be set by 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 **programme file** (format VD), the data sheet and the manual can be downloaded from the Elsner Elektronik homepage on **www.elsner-elektronik.de** in the "Service" menu.

1.1. Technical specifications

Housing	Plastic material, sensor sleeve metal
Colour	Grey
Mounting	On-wall
Protection category	IP 65
Dimensions	approx. 65 × 91 × 38 (W × H × D, mm)
Weight	approx. 80 g
Ambient temperature	Operation -30…+85°C, Storage -55…+125°C
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

BCU type	Own micro controller
PEI type	0
Group addresses	max. 184
Allocations	max. 184
Communication objects	110
Measurement range temperature	-40...+80°C
Resolution (temperature)	0,1°C
Accuracy (temperature)	±1°C at -10...+85°C ±1,5°C at -25...+150°C
Measurement range humidity	0...100%
Resolution (humidity)	0,1%
Accuracy (humidity)	0...20% = ±5%R. H. 20...80% = ±3%R. H. 80...100% = ±5%R. H.
Drift (humidity)	±0,5%R. H. per year in normal air

The following standards have been considered for the evaluation of the product in terms of electro magnetic compatibility:
Transient emissions:
• EN 60730-1:2000 Section EMV (23, 26, H23, H26) (threshold category: B)
• EN 50090-2-2:1996-11 + A1:2002-01 (threshold category: B)
• EN 61000-6-3:2001 (threshold category: B)
Interference resistance:
• EN 60730-1:2000 Section EMV (23, 26, H23, H26)
• EN 50090-2-2:1996-11 + A1:2002-01
• EN 61000-6-1:2004
The product has been tested for the above mentioned standards by an accredited EMV laboratory.

2. Installation and commissioning

2.1. Notes on installation

⚡ **Installation, inspection, commissioning and troubleshooting of the device must only be carried out by a competent electrician.**

Disconnect all lines to be assembled, and take safety precautions against accidental switch-on.

The device is exclusively intended for appropriate use. With each inappropriate change or non-observance of the instructions for use, any warranty or guarantee claim will be void.

After unpacking the device, check immediately for any mechanical damages. In case of transport damage, this must immediately notified to the supplier.

⚠ **If damaged, the device must not be put into operation.**

If an operation without risk may supposedly not be guaranteed, the device must be put out of operation and be secured against accidental operation.

The device must only be operated as stationary system, i.e. only in a fitted state and after completion of all installation and start-up works, and only in the environment intended for this purpose.

Elsner Elektronik does not assume any liability for changes in standards after publication of this instruction manual.

2.2. 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.

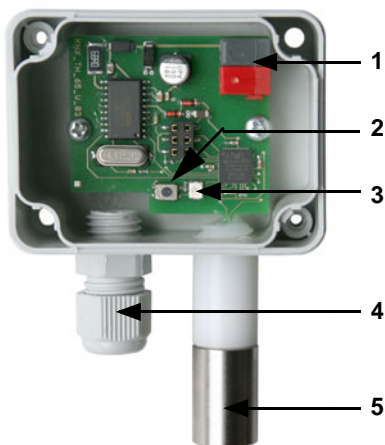# 2.3. Mounting and connection

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.

2.4. 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, as this will distort the measuring results until the humidity sensor is completely dry again.

After the bus voltage has been applied, the device will enter an initialisation phase lasting 5 seconds. During this phase no information can be received via the bus.

3. Maintenance

The sensor 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.

> ⚠ **As a precaution, the device should always be separated from bus current for maintenance works.**

4. Transmission protocol

4.1. List of all communication objects

Abbreviations flags:

C   Communication
R   Read
W   Write
T   Transmit
U   Update

No.	Name	Function	DPT	Flags
0	External measured value for temperature	Input	9.001	C W
1	Internal measured value for temperature	Output	9.001	C R T
2	Total measured value for temperature	Output	9.001	C R T
3	Request min./max. measured value for temperature	Input	1.017	C W
4	Minimum measured value for temperature	Output	9.001	C R T
5	Maximum measured value for temperature	Output	9.001	C R T
6	Reset min./max. measured value for temperature	Input	1.017	C W
7	Temperature sensor malfunction	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

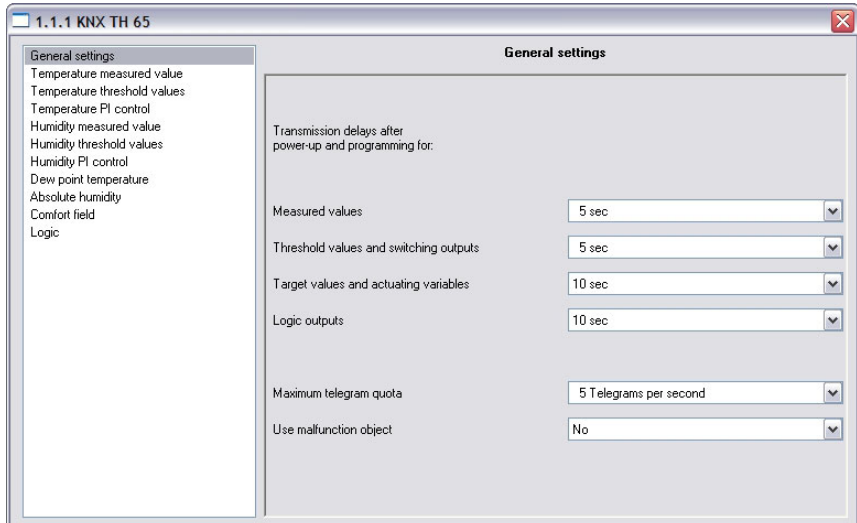| No.	Name	Function	DPT	Flags
17	Temp. threshold value 3: Absolute value	Input / Output	9.001	C R W T U
18	Temp. threshold value 3: (1:+ | 0:-)	Input	1.006	C W
19	Temp. threshold value 3: Switching output	Output	1.001	C R T
20	Temp. threshold value 3: Switching output block	Input	1.006	C W
21	Temp. threshold 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. control: Switching object (0:heating | 1:cooling)	Input	1.002	C W
26	Temp. control: Target value current	Output	9.001	C R T
27	Temp. control: Blocking object	Input	1.006	C R W
28	Temp. control: Target value, day heating	Input / Output	9.001	C R W T U
29	Temp. control: Target value, day heating (1:+ | 0:-)	Input	1.002	C W
30	Temp. control: Target value, day cooling	Input / Output	9.001	C R W T U
31	Temp. control: Target value, day cooling (1:+ | 0:-)	Input	1.002	C W
32	Temp. control: Act. variable heating 1. stage	Output	5.001	C R T
33	Temp. control: Act. variable heating 2. stage	Output	5.001	C R T
34	Temp. control: Act. variable heating 2. stage	Output	1.001	C R T
35	Temp. control: Act. variable cooling 1. stage	Output	5.001	C R T
36	Temp. control: Act. variable cooling 2. stage	Output	5.001	C R T
37	Temp. control: Act. variable cooling 2. stage	Output	1.001	C R T
38	Temp. control: Night lowering activation	Input	1.003	C W
39	Temp. control: Target value heating, night	Input / Output	9.001	C R W T U

No.	Name	Function	DPT	Flags
40	Temp. control: TargetV heating, night (1:+ | 0:-)	Input	1.002	C W
41	Temp. control: Target value cooling, night	Input / Output	9.001	C R W T U
42	Temp. control: TargetV cooling, night (1:+ | 0:-)	Input	1.002	C W
43	Temp. control: Status heating 1 (1=ON | 0=OFF)	Output	1.001	C R T
44	Temp. control: Status heating 2 (1=ON | 0=OFF)	Output	1.001	C R T
45	Temp. control: Status cooling 1 (1=ON | 0=OFF)	Output	1.001	C R T
46	Temp. control: Status cooling 2 (1=ON | 0=OFF)	Output	1.001	C R T
47	Temp. control: Window status (0: closed | 1: open)	Input	1.019	C W
48	External measured value for humidity	Input	9.007	C W
49	Internal measured value for humidity	Output	9.007	C R T
50	Total measured value for humidity	Output	9.007	C R T
51	Request min./max. measured value for humidity	Input	1.017	C W
52	Minimum measured value for humidity	Output	9.007	C R T
53	Maximum measured value for humidity	Output	9.007	C R T
54	Reset min./max. measured value for humidity	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

No.	Name	Function	DPT	Flags
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 control: Blocking object	Input	1.006	C W
64	Humidity control: Target value	Input / Output	9.007	C R W T U
65	Humidity control: Target value (1:+ | 0:-)	Input	1.006	C W
66	Humidity control: Act. variable dehumidification 1. stage	Output	5.001	C R T
67	Humidity control: Act. variable dehumidification 2. stage	Output	5.001	C R T
68	Humidity control: Act. variable humidification	Output	5.001	C R T
69	Dew point temperature	Output	9.001	C R T
70	Cooling medium temp.: Threshold value	Output	9.001	C R W T U
71	Cooling medium temp.: Actual value	Input	9.001	C W
72	Cooling medium temp.: Offset change (1:+ | 0:-)	Input	1.006	C W
73	Cooling medium temp.: Switching output	Output	1.001	C R T
74	Cooling medium 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: 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

No.	Name	Function	DPT	Flags
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
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

5. Setting of parameters

5.1. General settings

Transmission delays after power-up and programming for:	
Measured values	5 s • 10 s • 30 s • 1 min • ... • 2 h
Threshold values and switching outputs	5 s • 10 s • 30 s • 1 min • ... • 2 h
Target values and actuating variables	5 s • 10 s • 30 s • 1 min • ... • 2 h
Logic outputs	5 s • 10 s • 30 s • 1 min • ... • 2 h

Maximum telegram quota	1 • 2 • 3 • 5• 10 • 20 telegrams per second
Use malfunction object	No • Yes

5.2. Temperature measured value

Temperature offset in 0,1°C	-50...50
Use external measured value for temperature	No • Yes

If no external measured value is used

Use external measured value for temperature	**No**
Temperature measured value	• do not send • send periodically • send in case of change • send in case of change and periodically
From change of *(only if sending in "case of change")*	2% • 5% • 10% • 25% • 50%
Send periodically all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • ... • 2 h
Use min. and max. temperature values (Values are not maintained after reset)	No • Yes

If an external measured value is used

Use external measured value for temperature	**Yes**
Ext. temperature measured value proportion of the total measured value	5% ... 100% (in steps of 5%)

Internal and total measured value for temperature	• do not send • send periodically • send in case of change • send in case of change and periodically
All following settings refer to the total measured value	
From change of *(only if sending in "case of change")*	2% • 5% • 10% • 25% • 50%
Send periodically all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • ... • 2 h
Use min. and max. temperature values (Values are not maintained after reset)	No • Yes

5.3. Temperature threshold values

Use temperature threshold value 1/2/3/4	No • Yes

5.4. Temperature threshold value 1/2/3/4

Temperature threshold values

Use temperature threshold value 1/2/3/4	Parameter • Communication object

If the threshold value is set per Parameter:

Temperature threshold value standard per	**Parameter**
Temperature threshold value in 0,1°C	-300...800
Hysteresis of the threshold value in %	0...50

If the threshold value is set per Communication object:

Temperature threshold value standard per	**Communication object**
The value communicated last shall be maintained	• not • after restoration of voltage • after restoration of voltage and programming (Do not use for first commissioning)
Start temperature threshold value in 0,1°C valid until 1. communication *(only if the value communicated last is "not" maintained or after "restoration of voltage")*	-300 … 800
Type of threshold change for temperature	• Absolute value • Increment/decrement
Step size *(only with "Increment/decrement")*	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

Temperature switching output

Output is at (TV = temperature threshold value)	• TV above = 1 | TV – Hyst. below = 0 • TV above = 0 | TV – Hyst. below = 1 • TV below = 1 | TV + Hyst. above = 0 • TV below = 0 | TV + Hyst. 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
Temperature 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 temperature switching output *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • … • 2 h

Blocking

Use block of the temperature switching output	No • Yes
Evaluation of the temperature blocking object	• if value 1: block | if value 0: release • if value 0: block | if value 1: release
Value of the blocking object before 1. communication	0 • 1

Behaviour of switching output	
with blocking	• do not send telegram • send 0 • send 1

The behaviour with release of the switching output depends on the value of the parameter "Temperature switching output sends..." (see „Temperature switching output")

Value of parameter "Temperature switching output sends":	Setting options "Behaviour of switching output with release":
on change	• do not send telegram • send status of the switching output
on change to 1	• do not send telegram • if switching output = 1 ➜ send 1
on change to 0	• do not send telegram • if switching output = 0 ➜ send 0
on change and periodically	send status of the switching output (no selection)
on change to 1 and periodically	if switching output = 1 ➜ send 1 (no selection)
on change to 0 and periodically	if switching output = 0 ➜ send 0 (no selection)

5.5. Temperature PI control

Use control	No • Yes

If the control is in use

Use control	**Yes**

Control general

Type of control	• One-stage heating • Two-stage heating • One-stage cooling • One-stage heating + one-stage cooling • Two-stage heating + One-stage cooling • Two-stage heating + two-stage cooling

Behaviour of the blocking object with value	• 1 = block control |
	  0 = release control
	• 0 = block control |
	  1 = release control

Value of the blocking object before 1. communication	0 • 1

Send actuating variables	• on change • on change and periodically
Transmission cycle *(only if sending "periodically")*	5 s ... 2 h
Status object/s send	• 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
Transmission cycle *(only if sending "periodically")*	5 s ... 2 h

Controler target value

Target value setpoint per	Parameter • Communication object

If the target value is set per Parameter:

Target value setpoint per	**Parameter**
Target value in 0,1°C	-300 … 800

If the target value is set per Communication object:

Target value setpoint per	**Communication object**
The value communicated last shall be maintained	• not • after restoration of voltage • after restoration of voltage and programming (Do not use for first commissioning)
Start target value in 0,1°C valid until 1. communication *(only if the value communicated last is "not" maintained or "after restoration of voltage")*	-300 … 800
Limitation of object value (min) in 0,1°C	-300 … 800
Limitation of object value (max) in 0,1°C	-300 … 800
Type of the target value change	• Absolute value • Increment/decrement
Step size *(only with „Increment/decrement")*	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

Heating control/Heating control 1. stage
(Appears only if heating control is used)

Setting of the controller by	• preset applications • controller parameter
Application *(only if controller is set by "preset applications")*	• Hot water heating • Floor heating • Fan convector • Electrical heating
Maximum actuating variable is reached at target/actual difference of *(Attention: Can only be adjusted if "Setting of the controller by controller parameter")*	1°C • 2°C • 3°C • 4°C • 5 °C
Re-setting time in mins *(Attention: Can only be adjusted if "Setting of the controller by controller parameter")*	1 … 255
If blocked, the actuating variable shall	• will not be sent • send a specific value
Value in % (not if a specific value is sent)	0 … 100
With release, the actuating variable follows the control	

Presetting for "preset applications":

Application	Maximum actuating variable is reached at target/actual difference of	Re-setting time
Hot water heating	5°C	150 min
Floor heating	5°C	240 min
Fan convector	4°C	90 min
Electrical heating	4°C	100 min

Heating control 2. stage
(Appears only if two-stage heating control is used)

Target value difference between 1. and 2. stage in 0,1°C	0...100
Type of control of the 2. stage	• 2-point-control • PI control

If the 2. stage is controlled with 2-point-control:

Hysteresis in 0,1°C	0 … 100
Actuating variable is a	• 1 bit object
	• 8 bit object
Value in % *(only if actuating variable is an 8 bit object)*	0 … 100
If blocked, the actuating variable shall	• not be sent • send a specific value
Value in % *(only if a specific value is sent)*	0 … 100
With release, the actuating variable follows the control	

If the 2. stage is controlled with PI control:

Setting options see heating control 1. stage.

Cooling control/Cooling control 1. stage
(Appears only if cooling control is used)

Setting of the controller by	• preset applications • controller parameter
Application *(only if controller is set by "preset applications")*	• Cooling ceiling
Maximum actuating variable is reached at target/actual difference of *(Attention: Can only be adjusted if "Setting of the controller by controller parameter")*	1°C • 2°C • 3°C • 4°C • 5 °C

Re-setting in mins *(Attention: Can only be adjusted if "Setting of the controller by controller parameter")*	1 … 255
If blocked, the actuating variable shall	• not be sent • send a specific value
Value in % *(only if a specific value is sent)*	0 … 100
With release, the actuating variable follows the control	

Presetting for "preset applications":

Application	Maximum actuating variable is reached at target/actual difference of	Re-setting ime
Cooling ceiling	5°C	240 min

Cooling control 2. stage
(Appears only if two-stage cooling control is used)

Target value difference between 1. and 2. stage in 0,1°C	0 … 100
Type of control of the 2. stage	• 2-point-control • PI control

If the 2. stage is controlled with 2-point-control:

Hysteresis in 0,1°C	0 … 100
Actuating variable is a	• 1 bit object • 8 bit object
Value in % *(only if actuating variable is an 8 bit object)*	0 … 100
If blocked, the actuating variable shall	• not be sent • send a specific value
Value in % *(only if a specific value is sent)*	0 … 100
With release, the actuating variable follows the control	

If the 2. stage is controlled with PI control:

Setting options see cooling control 1. stage.

Night reduction

Use night reduction	No • Yes

If night reduction is used:

Use night reduction	**Yes**
Night reduction for object value	• 1 = active | 0 = not active • 0 = active | 1 = not active
Value of the activation object before 1. communication	0 • 1
Target value setpoint per	Parameter • Communication object

If the target value is set per Parameter:

Target value setpoint per	**Parameter**
Target value heating in 0,1°C *(if the heating control is used)*	-300 … 800
Target value cooling in 0,1°C *(if the cooling control is used)*	-300 … 800

If the target value is set per Communication object:

Target value setpoint per	**Communication object**
The value communicated last shall be maintained	• not • after restoration of voltage • after restoration of voltage and programming (Do not use for first commissioning)
Start target value heating in 0,1°C valid until 1. communication *(if the heating control is used and only if the value communicated last is "not" maintained or "after restoration of voltage")*	-300 … 800
Limitation of object value H(min) in 0,1°C	-300 … 800
Limitation of object value H(max) in 0,1°C	-300 … 800
Start target value cooling in 0,1°C valid until 1. communication *(if the cooling control is used and only if the value communicated last is "not" maintained or "after restoration of voltage")*	-300 … 800
Limitation of object value C(min) in 0,1°C	-300 … 800
Limitation of object value C(max) in 0,1°C	-300 … 800
Type of the target value change	• Absolute value • Increment/decrement
Step size *(only with "Increment/decrement")*	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

If frost/heat protection is used:

Use frost/heat protection	**Yes**
Target value heating in 0,1°C *(only if heating control is used)*	-300 … 800
Delay of activation (after opening window)	none • 1 s … 2 h
Target value cooling in 0,1°C *(only if cooling control is used)*	-300 … 800
Delay of activation (after opening window)	none • 1 s … 2 h
Status of window before 1. communication	CLOSED • OPENED

5.6. Humidity measured value

Humidity offset in % RH	-10 … 10
Use external measured value for humidity	No • Yes

If no external measured value is used:

Use external measured value for humidity	**No**
Humidity measured value	• do not send • send periodically • send in case of change • send in case of change and periodically
From change of *(only if sending "in case of change")*	2% • 5% • 10% • 25% • 50%
Send periodically all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • ... • 2 h
Use min. and max. humidity values *(Values are not maintained after reset)*	No • Yes

If an external measured value is used:

Use external measured value for humidity	**Yes**
Ext. humidity measured value proprotion of the total measured value	5% … 100% (in steps of 5%)

Internal and total measured value for humidity	• do not send • send periodically • send in case of change • send in case of change and periodically
All following settings refer to the total measured value for humidity	
From change of *(only if sending "in case of change")*	2% • 5% • 10% • 25% • 50%
Send periodically all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • ... • 2 h
Use min. and max. humidity values (Values are not maintained after reset)	No • Yes

5.7. Humidity threshold value

Use humidity threshold value 1/2	No • Yes

5.7.1. Humidity threshold value 1/2

Humidity threshold value:

Humidity threshold value setpoint per	Parameter • Communication object

If the threshold value is set per Parameter:

Humidity threshold value setpoint per	**Parameter**
Humidity threshold value in %RH	0 … 100
Hysteresis of the threshold value in %	0 … 50

If the threshold value is set per Communication object:

Humidity threshold value setpoint per	**Communication object**
The value communicated last shall be maintained	• not • after restoration of voltage • after restoration of voltage and programming (Do not use for first commissioning)
Start humidity threshold value in %RH valid until 1. communication *(only if the value communicated last is "not" maintained or "after restoration of voltage")*	0 … 100
Type of threshold change for humidity	• Absolute value • Increment/decrement
Step size *(only with "Increment/decrement")*	1% • 2% • 5% • 10%
Hysteresis of the threshold value in %	0 … 50

Humidity switching output

Output is at (TV = humidity threshold value)	• TV above = 1 | TV – Hyst. below = 0 • TV above = 0 | TV – Hyst. below = 1 • TV below = 1 | TV + Hyst. above = 0 • TV below = 0 | TV + Hyst. 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
Humidity 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 humidity switching output in the cycle of *(only if sending „periodically")*	5 s • 10 s • 30 s • 1 min • ... • 2 h

Blocking

Use block of the humidity switching output	No • Yes
Evaluation of the humidity blocking object	• if value 1: block | if value 0: release • if value 0: block | if value 1: release
Value of the humidity blocking object before 1. communication	0 • 1
Behaviour of humidity switching output	
with blocking	• do not send telegram • send 0 • send 1

The behaviour with release of the switching output depends on the value of the parameter "Humidity switching output sends..." (see "Humidity switching output")

Value of parameter "Humidity switching output sends":	Setting options "Behaviour of humidity switching output with release":
on change	• do not send telegram • send status of the switching output
on change to 1	• do not send telegram • if switching output = 1 ➔ send 1
on change to 0	• do not send telegram • if switching output = 0 ➔send 0
on change and periodically	send status of the switching output (no selection)
on change to 1 and periodically	if switching output = 1 ➔ send 1 (no selection)
on change to 0 and periodically	if switching output = 0 ➔ send 0 (no selection)

5.8. Humidity PI control

Use control	No • Yes

If the control is used

General humidity control:

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

Behaviour of the blocking object with value	• 1 = block control |
	  0 = release control
	• 0 = block control |
	  1 = release control

Value of the blocking object before 1. communication	0 • 1

Controller target value:

Target value setpoint per	Parameter • Communication object

If the target value is set per Parameter:

Target value setpoint per	**Parameter**
Target value in %	0 … 100
Dead zone between humidification and dehumidification in % *(only if type of control is a humidification and dehumidification)* Humidification starts with rel. humidity ⌐ Target value - dead zone	0 … 100

If the target value is set per Communication object:

Target value setpoint per	**Communication object**

The value communicated last shall be maintained	• not
	• after restoration of voltage
	• after restoration of voltage and
	  programming (Do not use for first
	  commissioning)

Start target value in % valid until 1. communication *(only if the value communicated last is "not" maintained or "after restoration of voltage")*	0 … 100
Type of the target value change	• Absolute value
	• Increment/decrement
Step size *(only with "Increment/decrement")*	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

Dehumidification/Dehumidification 1. stage

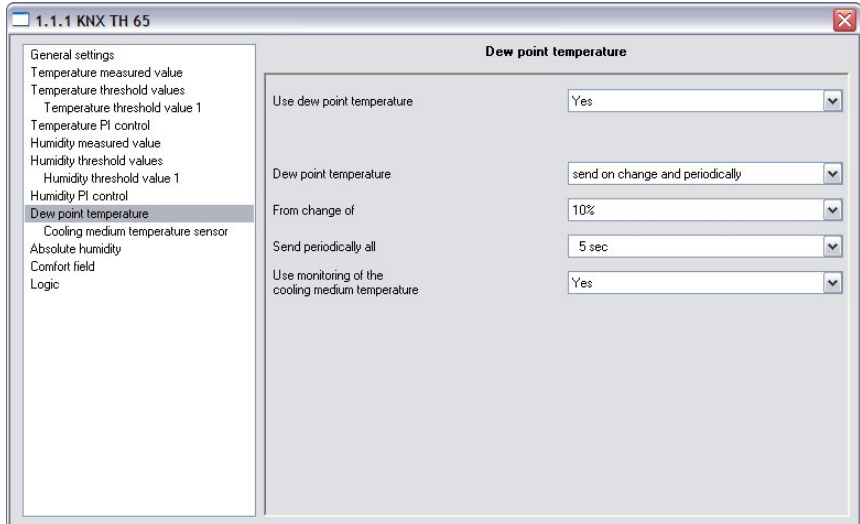|	
Maximum actuating variable is reached at target/actual difference of %	1 … 50
Re-setting time in mins	1 … 255
If blocked, the actuating variable shall	• not be sent • send a specific value
Value in % *(only if a specific value is sent)*	0 … 100
With release, the actuating variable follows the control	

Dehumidification 2. stage (Appears only if two-stage dehumidification is used)

Target value difference between 1. and 2. stage in %	0 … 50
Maximum actuating variable is reached at target/actual difference of %	1 … 50
Re-setting time in mins	1 … 255
If blocked, the actuating variable shall	• not be sent • send a specific value
Value in % *(only if a specific value is sent)*	0 … 100
With release, the actuating variable follows the control	

Humidification (Appears only if humidification and dehumidification is used)

Maximum actuating variable is reached at target/actual difference of %	1 … 50
Re-setting time in mins	1 … 255
If blocked, the actuating variable shall	• not be sent • send a specific value
Value in % *(only if a specific value is sent)*	0 … 100
With release, the actuating variable follows the control	

5.9. Dew point temperature

Use dew point temperature	No • Yes

If dew point temperature is used:

Dew point temperature	• do not send • send periodically • send in case of change • send in case of change and periodically
From change of *(only if sending "in case of change")*	2% • 5% • 10% • 25% • 50%
Send periodically all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • ... • 2 h
Use monitoring of the cooling medium temperature	No • Yes

5.9.1. Cooling medium temperature sensor

This point only appears if „Use monitoring of the cooling medium temperature: Yes"
is set in the dew point temperature menu.

Minimum cooling medium temperature threshold value

Threshold value = dew point temperature + offset	
The offset set last shall be maintained	• not • after restoration of voltage • after restoration of voltage and programming (Do not use for first commissioning)

Offset in °C *(only if the offset set last is "not" maintained or "after restoration of voltage")*	0 … 20
Step size for offset change per 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
Threshold value	• do not send • send periodically • send in case of change • send in case of change and periodically
From change of *(only if sending "in case of change")*	2% • 5% • 10% • 25% • 50%
Send periodically all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • …• 2 h

Switching output

Output is at (TV = Threshold value)	• TV above = 1 | TV – Hyst. below = 0 • TV above = 0 | TV – Hyst. below = 1 • TV below = 1 | TV + Hyst. above = 0 • TV below = 0 | TV + Hyst. 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 all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • … • 2 h

Blocking

Use block of the switching output	No • Yes
Evaluation of the blocking object	• if value 1: block | if value 0: release • if value 0: block | if value 1: release
Value of the humidity blocking object before 1. communication	0 • 1
Behaviour of switching output	
with blocking	• do not send telegram • send 0 • send 1

The behaviour with release of the switching output depends on the value of the parameter "Switching output sends…" (see "Switching output")

Value of parameter "Switching output sends":	Setting options "Behaviour of Switching output with release":
on change	• do not send telegram • send status of the switching output
on change to 1	• do not send telegram • if switching output = 1 ➜ send 1
on change to 0	• do not send telegram • if switching output = 0 ➜ send 0
on change and periodically	send status of the switching output (no selection)
on change to 1 and periodically	if switching output = 1 ➜ send 1 (no selection)
on change to 0 and periodically	if switching output = 0 ➜ send 0 (no selection)

5.10. Absolute humidity

Use absolute humidity	No • Yes

If absolute humidity is used

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

Transmission behaviour	• do not send • send periodically • send in case of change • send in case of change and periodically
From change of *(only if sending "in case of change")*	2% • 5% • 10% • 25% • 50%
Send periodically all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • ... • 2 h

5.11. Comfort field

Use comfort field	No • Yes

If the comfort field is used

Transmission behaviour	• 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 all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • ... • 2 h

maximum temperature in °C (Standard = 26°C)	25 ... 40

minimum temperature in °C (Standard = 20°C)	10 … 21
maximum relative humidity in % (Standard = 65%)	52 … 90
minimum relative humidity in % (Standard = 30%)	10 … 43
maximum absolute humidity in 0,1 g/kg (Standard = 11,5 g/kg)	50 … 200

Standard values correspond to DIN 1946.

Hysteresis of temperature: 1°C
Hysteresis of relative humidity: 2% RH
Hysteresis of absolute humidity: 2 g/kg

5.12. Logic

Communication objects logic inputs	do not release • release

AND Logic

Logic 1/2/3/4	not active • active

OR Logic

Logic 1/2/3/4	not active • active

5.12.1. AND Logic 1/2/3/4

1. / 2. / 3. / 4. Input	• do not use • all switching events which the sensor provides (see "Linkage inputs of the AND logic")
Logic output sends	not • one 1 bit object • two 8 bit objects

If the logic output sends one 1 bit object:

Logic output sends	**one 1 bit object**
If logic = 1 ➔ object value	1 • 0
If logic = 0 ➔ object value	0 • 1
Communication object AND Logic 1 / 2 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 all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • ... • 2 h

If the logic output sends two 8 bit objects:

Logic output sends	**two 8 bit objects**
If logic = 1 ➔ object A value	0 ... 255
If logic = 0 ➔ object A value	0 ... 255
If logic = 1 ➔ object B value	0 ... 255
If logic = 0 ➔ object B value	0 ... 255
Communication object AND Logic 1 A and B send	• 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 all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • ... • 2 h

5.12.2. Linkage inputs of AND logic

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 invertiert |
| 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 |
| Malfunction sensor |
| Malfunction sensor inverted |

5.12.3. OR Logic 1/2/3/4

1. / 2. / 3. / 4. Input	• do not use • all switching events which the sensor provides (see "Linkage inputs of the OR logic")
Logic output sends	one 1 bit object • two 8 bit objects

If the logic output sends one 1 bit object:

Logic output sends	**one 1 bit object**
If logic = 1 ➔object value	1 • 0
If logic = 0 ➔object value	0 • 1
Communication object OR Logic 1 / 2 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 all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • ... • 2 h

If the logic output sends two 8 bit objects:

Logic output sends	**two 8 bit objects**
If logic = 1 ➔object A value	0 ... 255
If logic = 0 ➔object A value	0 ... 255
If logic = 1 ➔object B value	0 ... 255
If logic = 0 ➔object B value	0 ... 255
Communication objects OR Logic 1 /2 A and B send	• 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 all *(only if sending "periodically")*	5 s • 10 s • 30 s • 1 min • ... • 2 h

5.12.4. Linkage inputs of 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