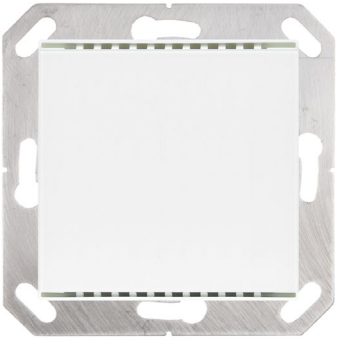
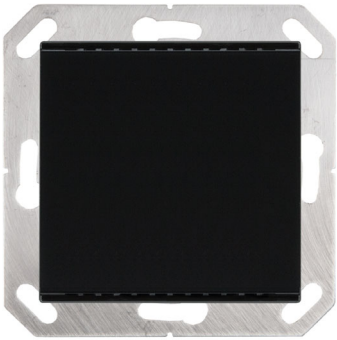
KNX TH-UP gl

Combined indoor sensor

Item numbers 70623 (pure white), 70622 (jet black)





elsner elektronik

Installation and Adjustment

1. Description 5
1.0.1. Scope of delivery 5
1.1. Technical specifications 6
1.1.1. Accuracy of the measurement 6
2. Installation and commissioning 7
2.1. Installation notes 7
2.2. Installation position 7
2.3. Composition 9
2.3.1. Housing 9
2.4. Assembly of the sensor 9
2.5. Notes on mounting and commissioning 9
3. Addressing of the device at the bus 10
4. Transfer protocol 11
4.1. List of all communications objects 11
5. Parameter setting 18
5.1. Behaviour on power failure/ restoration of power 18
5.2. General settings 19
5.3. Temperature value 19
5.4. Temperature threshold values 20
5.4.1. Threshold value 1, 2, 3 20
5.4.1.1. Threshold value 20
5.4.1.2. Switching output 21
5.4.1.3. Block 21
5.5. Temperature PI control 22
5.5.0.1. General control 22
5.5.1. General set point values 24
5.5.1.1. Set point Comfort 25
5.5.1.2. Standby setpoint 25
5.5.1.3. Eco setpoint 26
5.5.1.4. Setpoint values for frost/heat protection (building protection) 26
5.5.1.5. General control variables 27
5.5.2. Heating control level 1/2 27
5.5.3. Cooling control level 1/2 29
5.6. Humidity measurement 32
5.7. Humidity threshold values 32
5.7.1. Threshold value 1, 2 32
5.7.1.1. Threshold value 32
5.7.1.2. Switching output 33
5.7.1.3. Block 34
5.8. Humidity PI control 35
5.8.0.1. General control 35
5.8.0.2. Controller setpoint 36

5.8.0.3. Dehumidification and/or humidification 37
5.9. Dewpoint measurement 38
5.9.1. Cooling medium temp. monitoring 38
5.9.1.1. Threshold value 38
5.9.1.2. Switching output 39
5.9.1.3. Blocking 39
5.10. Absolute humidity 40
5.11. Comfort field 41
5.12. Variable comparator 41
5.12.1. Control variable comparator 1/2 41
5.13. Logic 42
5.13.0.1. AND logic 42
5.13.0.2. OR logic 42
5.13.1. AND logic 1-4 and OR logic outputs 1-4 43
5.13.1.1. Block 44
5.13.2. Connection inputs of the AND logic 44
5.13.3. Connection inputs of the OR logic 46

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

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 **Sensor KNX TH-UP gl** measures the 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 overall values (mixed values, e. g. room average).

The **KNX TH-UP gl** provides switching outputs with adjustable threshold values. The switching outputs and further communication objects can be linked by AND and OR logic gates. Additionally, an integrated actuating variable comparator can compare and output values that are received via communication objects.

Integrated PI controllers allows for control of a ventilation (depending on air humidity) and a heating/cooling system (depending on temperature). The **KNX TH-UP gl** can emit a warning to the bus as soon as the area of optimum comfort (according to DIN 1946) is left.

The device is completed with a frame of the switching series installed in the building and thus merges with the interior.

Functions:

- Measurement of **temperature** and **air humidity** (absolute and relative), calculation of the 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. Control according to separate target values or basic target temperature
- **PI controller for ventilation** depending on humidity: dehumidification/ humidification (one step) or dehumidification (one or two step)
- **Threshold values** can be adjusted per parameter or via communication objects: 3 × temperature, 2 × humidity
- **4 AND and 4 OR logic gates** with each 4 inputs. Every switching incident as well as 16 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
- **2 actuating variable comparators** for output of minimum, maximum or average values. Each with 5 inputs (for values received via communication objects)

Configuration is made using the KNX software ETS 5. The **product file** can be downloaded from the ETS online catalogue and the Elsner Elektronik website on **www.elsner-elektronik.de** in the “Service” menu.

1.0.1. Scope of delivery

- Housing
- Base plate

You will need *in addition* (not supplied):

- Socket Ø 60 mm, 42 mm deep

- Frame (for element 55 x 55 mm), suitable for the switching programme used in the building

1.1. Technical specifications

Housing	Real glass, plastic
Colours	• similar to RAL 9005 jet black • similar to RAL 9010 pure white
Mounting	In-wall (wall mounting in socket Ø 60 mm, 42 mm deep, resp. cavity wall socket for hole Ø 68 mm)
Protection category	IP 20
Dimensions	Housing approx. 55 x 55 (W x H, mm), mounting depth approx. 8 mm, base plate approx. 71 x 71 (W x H, mm)
Total weight	approx. 45 g
Ambient temperature	Operation 0…+50°C, storage -10…+60°C
Ambient air humidity	max. 95% RH, avoid bedewing
Operating voltage	KNX bus voltage
Bus current	max. 10 mA
Data output	KNX +/- bus terminal plug
BCU type	Own micro controller
PEI type	0
Group addresses	max. 254
Allocations	max. 254
Communication objects	158
Temperature measurement range	0…+50°C
Temperature resolution	0.1°C
Humidity measurement range	0% RH …95% RH
Humidity resolution	0.1%
Humidity drift	± 0.5% R.H. per year in normal air

The product conforms with the provisions of EU guidelines.

1.1.1. Accuracy of the measurement

Measurement variations from permanent sources of interference (see chapter *Installation position*) can be corrected in the ETS in order to ensure the specified accuracy of the sensor (offset).

When **measuring temperature**, the self-heating of the device is considered by the electronics. The heating is compensated by the software.

2. Installation and commissioning

2.1. Installation notes

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

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

- National legal regulations are to be followed.
- Ensure that all lines to be assembled are free of voltage and take precautions against accidental switching on.
- Do not use the device if it is damaged.
- Take the device or system out of service and secure it against unintentional use, if it can be assumed, that risk-free operation is no longer guaranteed.

The device is only to be used for its intended purpose. Any improper modification or failure to follow the operating instructions voids any and all warranty and guarantee claims.

After unpacking the device, check it immediately for possible mechanical damage. If it has been damaged in transport, inform the supplier immediately.

The device may only be used as a fixed-site installation; that means only when assembled 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.

2.2. Installation position

The **Sensor KNX TH-UP gl** is made for wall mounting in a socket (Ø 60 mm, 42 mm deep).

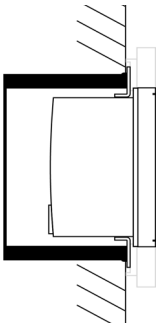


Fig. 1: Sectional drawing.
*The **Sensor KNX TH-UP gl** fits into a standard socket (Ø 60 mm, depth 42 mm).*

The frame is not included!

May be installed and operated in dry interior rooms only. Avoid condensation.

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
- Draft from ducts which lead from other rooms or from the outside to the junction box in which the sensor is mounted
- 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 and ducts which lead from warmer or colder areas to the sensor

Measurement variations from permanent sources of interference can be corrected in the ETS in order to ensure the specified accuracy of the sensor (offset).

2.3. Composition

2.3.1. Housing

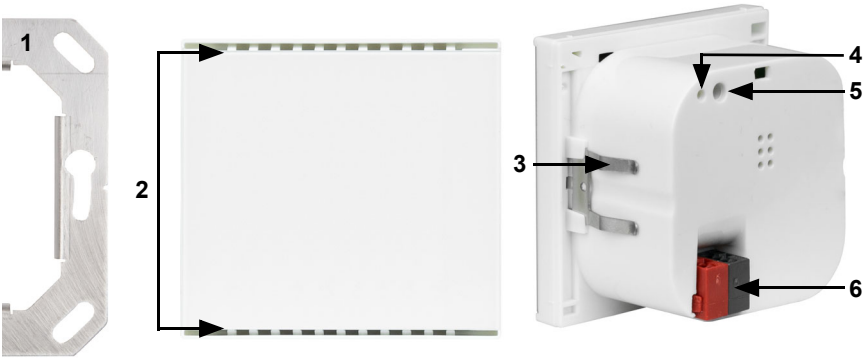


Fig. 2
1 Base plate
2 Openings for air circulation
3 Catches
4 Programming LED (recessed)
5 Programming button (recessed) for teaching device
6 KNX terminal BUS +/-

2.4. Assembly of the sensor

First of all fit the windproof socket with connection. Also seal inlet pipes to avoid infiltration.
Screw the base plate onto the socket and position the frame of the switching programme. Connect the bus line +/- to the black-red plug.
Pin the housing with the notches on to the metal frame, so that device and frame are fixed. The device has to be inserted such that the bus terminal faces down (see Fig. 2). This is necessary for a correct temperature measurement.

2.5. Notes on mounting and commissioning

Never expose the device to water (e.g. rain) or dust. This can damage the electronics. You must not exceed a relative humidity of 95%. Avoid condensation.

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. Transfer protocol

Units:

Temperatures in degrees Celsius
Air humidity in %
Absolute air humidity in g/kg and/or g/m^3
Variables in %

4.1. List of all communications objects

Abbreviation flags:

C Communication
R Read
W Write
T Transfer
U Update

No	Name	Function	Flags	Data Point Type	Size
0	Software version	readable	R-CT	[217.1] DPT_Version	2 Bytes
1	Temperature/humidity malfunction sensor	Output	R-CT	[1.1] DPT_Switch	1 Bit
3	Outside temperature reading	Input	-WC-	[9.1] DPT_Value_Temp	2 Bytes
4	Inside temperature reading	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
5	Overall temperature reading	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
6	Min./max. temperature value request	Input	-WC-	[1.17] DPT_Trigger	1 Bit
7	Minimum temperature reading	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
8	Maximum temperature reading	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
9	Reset min./max. temperature value	Input	-WC-	[1.17] DPT_Trigger	1 Bit
10	Temp. threshold value 1: Absolute value	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
11	Temp. threshold value 1: (1:+ | 0:-)	Input	-WC-	[1.2] DPT_Bool	1 Bit
12	Temp. threshold value 1: Switching delay from 0 to 1	Input	-WC-	[9.010] DPT_Value_Time	2 Bytes
13	Temp. threshold value 1: Switching delay from 1 to 0	Input	-WC-	[9.010] DPT_Value_Time	2 Bytes
14	Temp. threshold value 1: Switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit

No	Name	Function	Flags	Data Point Type	Size
15	Temp. threshold value 1: Switching output block	Input	-WC-	[1.2] DPT_Bool	1 Bit
16	Temp. threshold value 2: Absolute value	Input/ Output	RWC T	[9.1] DPT_Value_Temp	2 Bytes
17	Temp. threshold value 2: (1:+ | 0:-)	Input	-WC-	[1.2] DPT_Bool	1 Bit
18	Temp. threshold value 2: Switching delay from 0 to 1	Input	-WC-	[9.010] DPT_Value_Time	2 Bytes
19	Temp. threshold value 2: Switching delay from 1 to 0	Input	-WC-	[9.010] DPT_Value_Time	2 Bytes
20	Temp. threshold value 2: Switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
21	Temp. threshold value 2: Switching output block	Input	-WC-	[1.2] DPT_Bool	1 Bit
22	Temp. threshold value 3: Absolute value	Input/ Output	RWC T	[9.1] DPT_Value_Temp	2 Bytes
23	Temp. threshold value 3: (1:+ | 0:-)	Input	-WC-	[1.2] DPT_Bool	1 Bit
24	Temp. threshold value 3: Switching delay from 0 to 1	Input	-WC-	[9.010] DPT_Value_Time	2 Bytes
25	Temp. threshold value 3: Switching delay from 1 to 0	Input	-WC-	[9.010] DPT_Value_Time	2 Bytes
26	Temp. threshold value 3: Switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
27	Temp. threshold value 3: Switching output block	Input	-WC-	[1.2] DPT_Bool	1 Bit
29	TR_1_ Eco-Standby HVAC 1	Input	-WC-	[20.102] DPT_HVACMode	1 Byte
30	TR_1_ Comfort Activation HVAC 2	Input	RWC T	[20.102] DPT_HVACMode	1 Byte
31	TR_1_ Frost/Heat activation	Input	RWC T	[1.1] DPT_Switch	1 Bit
32	TR_1_ Blocking object (active at value = 1)	Input	-WC-	[1.1] DPT_Switch	1 Bit
33	TR_1_ Target value, current	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
34	TR_1_ Switching object (0:Heat | 1:Cool)	Input	-WC-	[1.1] DPT_Switch	1 Bit
35	TR_1_ Target value, comfort heating	Input/ Output	RWC T	[9.1] DPT_Value_Temp	2 Bytes
36	TR_1_ Target value, comfort heating (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
37	TR_1_ Target value, comfort cooling	Input/ Output	RWC T	[9.1] DPT_Value_Temp	2 Bytes

No	Name	Function	Flags	Data Point Type	Size
38	TR_1_ Target value, comfort cooling (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
39	TR_1_ Target value_Basic offset 16 Bit	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
40	TR_1_ Target value, Standby heating	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
41	TR_1_ Target value, Standby heating (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
42	TR_1_ Target value, Standby cooling	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
43	TR_1_ Target value, Standby cooling (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
44	TR_1_ Target value, Eco heating	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
45	TR_1_ Target value, Eco heating (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
46	TR_1_ Target value, Eco cooling	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
47	TR_1_ Target value, Eco cooling (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
48	TR_1_ Control variable heating (stage 1)	Output	R-CT	[5.1] DPT_Scaling	1 Byte
49	TR_1_ Control variable heating stage 2	Output	R-CT	[5.1] DPT_Scaling	1 Byte
50	TR_1_ Control variable cooling (stage 1)	Output	R-CT	[5.1] DPT_Scaling	1 Byte
51	TR_1_ Control variable cooling stage 2	Output	R-CT	[5.1] DPT_Scaling	1 Byte
52	TR_1_ Status heating 1 (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 Bit
53	TR_1_ Status heating 2 (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 Bit
54	TR_1_ Cooling status 1 (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 Bit
55	TR_1_ Cooling status 2 (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 Bit
56	TR_1_ Comfort Delay Status	Input/ Output	RWCT	[1.1] DPT_Switch	1 Bit
57	TR_1_Comfort extension time (in sec)	Input/ Output	RWCT	[7.5] DPT_TimePeriodSec	2 Bytes
58	TR_1_Belimo_Control variable	Output	R-CT	[5.1] DPT_Scaling	1 Byte
59	Outside humidity reading	Input	-WC-	[9.7] DPT_Value_Humidity	2 Bytes

No	Name	Function	Flags	Data Point Type	Size
60	Inside humidity reading	Output	R-CT	[9.7] DPT_Value_Humidity	2 Bytes
61	Overall humidity reading	Output	R-CT	[9.7] DPT_Value_Humidity	2 Bytes
62	Min./max. humidity value request	Input	-WC-	[1.17] DPT_Trigger	1 Bit
63	Minimum humidity reading	Output	R-CT	[9.7] DPT_Value_Humidity	2 Bytes
64	Maximum humidity reading	Output	R-CT	[9.7] DPT_Value_Humidity	2 Bytes
65	Reset min./max. humidity value	Input	-WC-	[1.17] DPT_Trigger	1 Bit
66	Humidity threshold value 1: Absolute value	Input/ Output	RWCT	[9.7] DPT_Value_Humidity	2 Bytes
67	Humidity threshold value 1: (1:+ | 0:-)	Input	-WC-	[1.2] DPT_Bool	1 Bit
68	Humidity threshold value 1: Switching delay from 0 to 1	Input	-WC-	[9.010] DPT_Value_Time	2 Bytes
69	Humidity threshold value 1: Switching delay from 1 to 0	Input	-WC-	[9.010] DPT_Value_Time	2 Bytes
70	Humidity threshold value 1: Switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
71	Humidity threshold value 1: Switching output block	Input	-WC-	[1.2] DPT_Bool	1 Bit
72	Humidity threshold value 2: Absolute value	Input/ Output	RWCT	[9.7] DPT_Value_Humidity	2 Bytes
73	Humidity threshold value 2: (1:+ | 0:-)	Input	-WC-	[1.2] DPT_Bool	1 Bit
74	Humidity threshold value 2: Switching delay from 0 to 1	Input	-WC-	[9.010] DPT_Value_Time	2 Bytes
75	Humidity threshold value 2: Switching delay from 1 to 0	Input	-WC-	[9.010] DPT_Value_Time	2 Bytes
76	Humidity threshold value 2: Switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
77	Humidity threshold value 2: Switching output block	Input	-WC-	[1.2] DPT_Bool	1 Bit
78	Humidity controller: Blocking object	Input	-WC-	[1.2] DPT_Bool	1 Bit
79	Humidity controller: Target value	Input/ Output	RWCT	[9.7] DPT_Value_Humidity	2 Bytes
80	Humidity controller: Target value (1:+ | 0:-)	Input	-WC-	[1.2] DPT_Bool	1 Bit
81	Humidity controller: Control variable dehumidification (stage 1)	Output	R-CT	[5.1] DPT_Scaling	1 Byte

No	Name	Function	Flags	Data Point Type	Size
82	Humidity controller: Control variable dehumidification stage 2	Output	R-CT	[5.1] DPT_Scaling	1 Byte
83	Humidity controller: Control variable humidification	Output	R-CT	[5.1] DPT_Scaling	1 Byte
84	Humidity controller: Dehumidification 1 status (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 Bit
85	Humidity controller: Dehumidification 2 status (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 Bit
86	Humidity controller: Humidification status (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 Bit
87	Dewpoint temperature	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
88	Coolant temp.: Threshold value	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
89	Coolant temp.: Actual value	Input	-WC-	[9.1] DPT_Value_Temp	2 Bytes
90	Coolant temp.: Offset change (1:+ | 0:-)	Input	-WC-	[1.2] DPT_Bool	1 Bit
91	Coolant temp.: Switching delay from 0 to 1	Input	-WC-	[9.010] DPT_Value_Time	2 Bytes
92	Coolant temp.: Switching delay from 1 to 0	Input	-WC-	[9.010] DPT_Value_Time	2 Bytes
93	Coolant temp.: Switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
94	Coolant temp.: Switching output block	Input	-WC-	[1.2] DPT_Bool	1 Bit
95	Absolute humidity [g/kg]	Output	R-CT	[14.5] DPT_Value_Amplitude	4 Bytes
96	Absolute humidity [g/m³]	Output	R-CT	[14.17] DPT_Value_Density	4 Bytes
97	Ambient climate status: 1 = comfortable | 0 = uncomfortable	Output	R-CT	[1.2] DPT_Bool	1 Bit
135	Comparator 1 actuating variable: Input 1	Input	-WC-	[5.1] DPT_Scaling	1 Byte
136	Comparator 1 actuating variable: Input 2	Input	-WC-	[5.1] DPT_Scaling	1 Byte
137	Comparator 1 actuating variable: Input 3	Input	-WC-	[5.1] DPT_Scaling	1 Byte
138	Comparator 1 actuating variable: Input 4	Input	-WC-	[5.1] DPT_Scaling	1 Byte
139	Comparator 1 actuating variable: Input 5	Input	-WC-	[5.1] DPT_Scaling	1 Byte

No	Name	Function	Flags	Data Point Type	Size
140	Comparator 1 actuating variable: Output	Output	R-CT	[5.1] DPT_Scaling	1 Byte
141	Comparator 1 actuating variable: Block	Input	-WC-	[1.2] DPT_Bool	1 Bit
142	Comparator 2 actuating variable: Input 1	Input	-WC-	[5.1] DPT_Scaling	1 Byte
143	Comparator 2 actuating variable: Input 2	Input	-WC-	[5.1] DPT_Scaling	1 Byte
144	Comparator 2 actuating variable: Input 3	Input	-WC-	[5.1] DPT_Scaling	1 Byte
145	Comparator 2 actuating variable: Input 4	Input	-WC-	[5.1] DPT_Scaling	1 Byte
146	Comparator 2 actuating variable: Input 5	Input	-WC-	[5.1] DPT_Scaling	1 Byte
147	Comparator 2 actuating variable: Output	Output	R-CT	[5.1] DPT_Scaling	1 Byte
148	Comparator 2 actuating variable: Block	Input	-WC-	[1.2] DPT_Bool	1 Bit
149	AND logic 1: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
150	AND logic 1: 8-bit output A	Output	R-CT	[5] 5.xxx	1 Byte
151	AND logic 1: 8-bit output B	Output	R-CT	[5] 5.xxx	1 Byte
152	AND logic 1: Block	Input	-WC-	[1.2] DPT_Bool	1 Bit
153	AND logic 2: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
154	AND logic 2: 8-bit output A	Output	R-CT	[5] 5.xxx	1 Byte
155	AND logic 2: 8-bit output B	Output	R-CT	[5] 5.xxx	1 Byte
156	AND logic 2: Block	Input	-WC-	[1.2] DPT_Bool	1 Bit
157	AND logic 3: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
158	AND logic 3: 8-bit output A	Output	R-CT	[5] 5.xxx	1 Byte
159	AND logic 3: 8-bit output B	Output	R-CT	[5] 5.xxx	1 Byte
160	AND logic 3: Block	Input	-WC-	[1.2] DPT_Bool	1 Bit
161	AND logic 4: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit

No	Name	Function	Flags	Data Point Type	Size
162	AND logic 4: 8-bit output A	Output	R-CT	[5] 5.xxx	1 Byte
163	AND logic 4: 8-bit output B	Output	R-CT	[5] 5.xxx	1 Byte
164	AND logic 4: Block	Input	-WC-	[1.2] DPT_Bool	1 Bit
181	OR logic 1: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
182	OR logic 1: 8-bit output A	Output	R-CT	[5] 5.xxx	1 Byte
183	OR logic 1: 8-bit output B	Output	R-CT	[5] 5.xxx	1 Byte
184	OR logic 1: Block	Input	-WC-	[1.2] DPT_Bool	1 Bit
185	OR logic 2: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
186	OR logic 2: 8-bit output A	Output	R-CT	[5] 5.xxx	1 Byte
187	OR logic 2: 8-bit output B	Output	R-CT	[5] 5.xxx	1 Byte
188	OR logic 2: Block	Input	-WC-	[1.2] DPT_Bool	1 Bit
189	OR logic 3: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
190	OR logic 3: 8-bit output A	Output	R-CT	[5] 5.xxx	1 Byte
191	OR logic 3: 8-bit output B	Output	R-CT	[5] 5.xxx	1 Byte
192	OR logic 3: Block	Input	-WC-	[1.2] DPT_Bool	1 Bit
193	OR logic 4: 1-bit switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
194	OR logic 4: 8-bit output A	Output	R-CT	[5] 5.xxx	1 Byte
195	OR logic 4: 8-bit output B	Output	R-CT	[5] 5.xxx	1 Byte
196	OR logic 4: switching output block	Input	-WC-	[1.2] DPT_Bool	1 Bit
200	Logic input 1	Input	-WC-	[1.2] DPT_Bool	1 Bit
201	Logic input 2	Input	-WC-	[1.2] DPT_Bool	1 Bit
202	Logic input 3	Input	-WC-	[1.2] DPT_Bool	1 Bit

No	Name	Function	Flags	Data Point Type	Size
203	Logic input 4	Input	-WC-	[1.2] DPT_Bool	1 Bit
204	Logic input 5	Input	-WC-	[1.2] DPT_Bool	1 Bit
205	Logic input 6	Input	-WC-	[1.2] DPT_Bool	1 Bit
206	Logic input 7	Input	-WC-	[1.2] DPT_Bool	1 Bit
207	Logic input 8	Input	-WC-	[1.2] DPT_Bool	1 Bit
208	Logic input 9	Input	-WC-	[1.2] DPT_Bool	1 Bit
209	Logic input 10	Input	-WC-	[1.2] DPT_Bool	1 Bit
210	Logic input 11	Input	-WC-	[1.2] DPT_Bool	1 Bit
211	Logic input 12	Input	-WC-	[1.2] DPT_Bool	1 Bit
212	Logic input 13	Input	-WC-	[1.2] DPT_Bool	1 Bit
213	Logic input 14	Input	-WC-	[1.2] DPT_Bool	1 Bit
214	Logic input 15	Input	-WC-	[1.2] DPT_Bool	1 Bit
215	Logic input 16	Input	-WC-	[1.2] DPT_Bool	1 Bit

5. Parameter setting

5.1. 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.

5.2. General settings

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

Send delay after power-up and programming for:	
Measured values	5 s • ... • 2 h
Threshold values and switching outputs	5 s • ... • 2 h
Controller objects	5 s • 10 s • ... • 2 h
Logic outputs	5 s • 10 s • ... • 2 h
Maximum telegram quota	• 1 message per second • ... • 5 messages per second • ... • 20 messages per second
Use temp./humidity malfunction object	Yes • No

5.3. Temperature value

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

Offset in 0,1°C	-50…50; 0

The unit can calculate a **mixed value** from its own reading and an external value. Set the mixed value calculation if desired. If an external value is used, all of the following settings are referred to the total value.

Use external reading	Yes • No
Ext. Reading proportion of the total reading	5% • 10% • ... • 50% • ... • 100%
All of the following settings are referred to the total value.	
Send internal and total reading	• never • periodically • on change • on change and periodically
From change of *(if sent on change)*	0,1°C • 0,2°C • 0,5°C • ... • 5,0°C
Send cycle *(if sent periodically)*	5 s • 10 s • ... • 2 h

The **minimum and maximum readings** can be saved and sent to the bus. Use the „Reset temperature min/max. value“ objects to reset the values to the current readings. The values are not retained after a reset.

Use minimum/maximum value	Yes • No

5.4. Temperature threshold values

Activate the required temperature threshold values. The menus for setting the threshold values are displayed.

Use threshold value 1/2/3	Yes • <u>No</u>

5.4.1. Threshold value 1, 2, 3

Threshold value

Set, in which cases **threshold values** received via object are to be retained. The parameter is only taken into consideration if the setting via object is activated below. Please note that the setting "After power supply restoration and programming" should not be used for the initial start-up, as the factory settings are always used until the first communication (setting via objects is ignored).

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

Threshold value setting via parameter:

Set the threshold values and hysteresis directly.

Threshold value setting via	**Parameter** • Communication objects
Threshold value in 0.1°C	-300 ... 800; <u>200</u>

Threshold value setting via a communication object:

Define, how the threshold value is to 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 communication 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, so that it is retained in the event of a power supply failure and will be available once the power supply is restored.

Threshold value setting via	Parameter • **Communication objects**
The value communicated last shall be maintained	• <u>never</u> • after power supply restoration • after power supply restoration and programming
Start threshold value in 0.1°C valid until first communication	-300 ... 800; <u>200</u>
Object value limit (min) in 0.1°C	<u>-300</u>...800
Object value limit (max) in 0.1°C	-300...<u>800</u>

Type of threshold value change	Absolute value • Increase/decrease
Increment *(upon increase/decrease change)*	0,1 °C • ... • 5°C, 1°C

Set the **hysteresis** independent of the type of threshold value specification.

Hysteresis in % of the threshold value	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 + hyst. above = 0 • TV below = 0 |TV + hyst. above = 1
Delays can be set via objects (in seconds)	No • Yes
Switching delay from 0 to 1 *(If delay can be set via objects: valid until 1st communication)*	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching delay from 1 to 0 *(If delay can be set via objects: valid until 1st communication)*	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
Cycle *(only if sending periodically is selected)*	5 s • 10 s • 30 s... • 2 h

Block

The switching output can be blocked using an object.

Use switching output block	No • Yes

If the block is activated, define specifications here for the behaviour of the output when blocked.

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 1st communication	0 • 1
Behaviour of the switching output	
On block	• 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

5.5. Temperature PI control

Activate the control if you want to use it.

Use control	No • Yes

General control

Set, in which cases **setpoint values and extension time** received via object are to be retained. The parameter is only taken into consideration if the setting via object is activated below. Please note that the setting "After power supply restoration and programming" should not be used for the initial start-up, as the factory settings are always used until the 1st communication (setting via objects is ignored).
.

For an adequate regulation of the indoor temperature, comfort, standby, eco and building protection modes may be used.
Comfort when present,
Standby during short absences,
Eco as a night-time mode and
Frost/heat protection (building protection) during longer absences.

The settings for the temperature control include the set point temperatures for the individual modes. Objects are used to determine which mode is to be selected. A change of mode may be triggered manually or automatically (e.g. by a timer, window contact).

The **mode** may be switched with two 8 bit objects of different priority. Objects
„... HVAC mode (Prio 2)“ for switching in everyday operation and
„... HVAC mode (Prio 1)“ for central switching with higher priority.
The objects are coded as follows:

0 = Auto
1 = Comfort
2 = Standby
3 = Eco
4 = Building Protection

Alternatively, you can use three objects, with one object switching between eco and standby mode and the two others activating comfort mode and frost/heat protection mode respectively. The comfort object blocks the eco/standby object, and the frost/heat protection object has the highest priority. Objects
„... Mode (1: Eco, 0: Standby)“,
„... comfort activation mode" and
„... frost/heat protection activation mode"

Switch mode via	• two 8 Bit objects (HVAC Modes) • three 1 bit objects

Select the **mode to be activated after reset** (e.g. power failure, reset of the line via the bus) (Default).
Then configure a temperature control **block** via the blocking object.

Mode after reset	• Comfort • Standby • Eco • Building protection
Behaviour of the blocking object with value	• 1 = Block | 0 = release • 0 = block | 1 = release
Blocking object value before 1st communication	0 • 1

Specify when the current **control variables** of the controller are to be **sent** to the bus. Periodic sending is safer, in case 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
from change (in % absolute)	1...10; 2
Cycle *(if sent periodically)*	5 s • ... • 5 min • ... • 2 h

The **status object** reports the current status of the control variables (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 objects	• 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

Cycle *(if sent periodically)*	5 s • ... • 5 min • ... • 2 h

Then 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 • Single-level heating + single-level cooling • Dual-level heating + single-level cooling • Dual-level heating + dual-level cooling

General set point values

You may enter separate set point values for each mode or use the comfort set point as a basic value.
If you are using the controls for both heating *and* cooling, you may also select the setting "separately with switching object". Systems used for cooling in the summer and for heating in the winter can thus be switched from one to the other.
If you are using the basic value, only the deviation from the comfort set point value is listed for the other modes (e. g., 2°C less for standby mode).

Preserve modified set points after mode change	No • Yes
Setting the nominal values	• separate with switching object • separate without switching object • with comfort set point as a basis

The grades for the set point changes is predefined. Modifications may only remain active temporarily (do not save) or remain saved even after voltage recovery (and programming). This also applies to a comfort extension.

Grading for set point changes (in 0.1 °C)	1... 50; 10
Saving set point value(s)	not • after voltage recovery • after voltage recovery and programming

The control may be manually reset to comfort mode from eco, or night mode. This allows the user to maintain the daily nominal value for a longer time, e.g. when having guests. The duration of this comfort extension period is set. After the comfort extension period is terminated, the system returns to eco mode.

Comfort extension time in seconds (can only be activated from eco mode)	1...36000; 3600

Set point Comfort

Comfort mode is usually used for daytime mode when people are present. A starting value is defined for the comfort set point as well as a temperature range in which the nominal value may be modified.

Initial heating/cooling set point (in 0.1 °C) valid till 1st communication *not upon saving the set point value after programming*	-300…800; 210

If set point values are entered separately:

Min. object value heating/cooling (in 0.1 °C)	-300…800; 160
Max. object value heating/cooling (in 0.1 °C)	-300…800; 280

If the comfort setpoint value is used as a basis:

If the comfort setpoint value is used as a basis, the reduction/increment of the value is set.

Starting heating/cooling setpoint (in 0.1 °C) valid until 1st communication	-300…800; 210
Minimum base setpoint (in 0.1°C)	-300…800; 160
Maximum base setpoint (in 0.1°C)	-300…800; 280
Reduction by up to (in 0.1°C)	0…100; 50
Increase by up to (in 0.1°C)	0…100; 50

If the comfort setpoint is used as the basis without a switching object, a dead zone is specified for the control mode "heating *and* cooling" to avoid direct switching from heating to cooling.

Dead zone between heating and cooling in 0,1°C *(only if both heating AND cooling are used)*	1…100; 50

Standby setpoint

Standby mode is usually used for daytime mode when people are absent.

If setpoint values are entered separately:

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

Starting heating setpoint (in 0.1 °C) valid until 1st communication	-300…800; 180
Starting heating setpoint (in 0.1 °C) valid until 1st communication	-300…800; 240

Min. object value heating/cooling (in 0.1 °C)	-300…800; 160
Max. object value heating/cooling (in 0.1 °C)	-300…800; 280

If the comfort setpoint value is used as a basis:

If the comfort setpoint value is used as a basis, the reduction/increment of the value is set.

Reduce heating setpoint (in 0.1°C) *(for heating)*	0…200; 30
Increase cooling setpoint (in 0.1°C) *(for cooling)*	0…200; 30

Eco setpoint

Eco mode is usually used for night mode.

If setpoint values are entered separately:

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

Starting heating setpoint (in 0.1 °C) valid until 1st communication	-300…800; 160
Starting cooling setpoint (in 0.1 °C) valid until 1st communication	-300…800; 280
Min. object value heating/cooling (in 0.1 °C)	-300…800; 160
Max. object value heating/cooling (in 0.1 °C)	-300…800; 280

If the comfort setpoint value is used as a basis:

If the comfort setpoint value is used as a basis, the reduction/increment of the value is set.

Reduce heating setpoint (in 0.1°C) *(for heating)*	0…200; 50
Increase cooling setpoint (in 0.1°C) *(for cooling)*	0…200; 60

Setpoint values for frost/heat protection (building protection)

The building protection mode is for example used as long as windows are opened for ventilation. Setpoints for frost protection (heating) and heat protection (cooling) are determined which may not be modified from outside (no access via operating devices etc.). The building protection mode may be activated with delay, which allows you to leave the building before the controls switch to frost/heat protection mode.

Setpoint frost protection (in 0.1°C)	-300…800; 70
Activation delay	less than • 5 s • ... • 5 min • ... • 2 h

Setpoint heat protection (in 0.1°C)	-300…800; 350
Activation delay	none • 5 s • ... • 5 min • ... • 2 h

General control variables

This setting appears for the control types "Heating *and* Cooling" only. Here, you can decide whether to use a common control variable for heating and cooling. If the 2nd level has a common control variable, you also determine the control mode of the 2nd level here.

For heating and cooling	• separate control variables are used • common control variables are used for Level 1 • common control variables are used for Level 2 • common control variable are used for Level 1+2
Use control variable for 4/6-way valve *(only for common control variables in level 1)*	No • Yes
Control type *(for level 2 only)*	• 2-point-control • PI control
Control variable of the 2nd Level is on *(only for level 2 with 2 point controlling)*	• 1 bit object • 8 bit object

When using the control variable for a 4/6 way valve, the following applies:
0%...100% heating = 66%...100% control variable
OFF = 50% control variable
0%...100% cooling = 33%...0% control variable

5.5.1. 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 (in °C)	1...5
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

In case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

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

In case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

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

5.5.2. 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 set-point 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 (in °C)	1...5
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

In case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

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

In case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

5.6. Humidity measurement

Select (see *5.2.General settings*), whether a **malfunction object** is to be sent if the sensor is faulty.

Use malfunction object	No • Yes

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

Offset in % RH	-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. If an external portion is used, all of the following settings (threshold values, etc.) are related to the overall reading.

Use external measured value	No • Yes
Ext. Reading proportion of the total reading	5% • 10% • ... • 50% • ... • 100%
All of the following settings are referred to the total value.	
Send internal and total reading	• never • periodically • on change • on change and periodically
At and above change of *(if sent on change)*	0.1% RH • 0.2% RH • 0.5% RH • 1.0% RH • ... • 25% RH
Send cycle *(if sent periodically)*	5 s • 10 s • ... • 2 h

The **minimum and maximum readings** can be saved and sent to the bus. Use the „Reset humidity min/max value“ object to reset the values to the current readings. The values are not retained after a reset.

Use minimum and maximum value	No • Yes

5.7. Humidity threshold values

Activate the required air humidity threshold values. The menus for setting the threshold values are displayed.

Use threshold value 1/2	Yes • No

5.7.1. Threshold value 1, 2

Threshold value

Set, in which cases **threshold values and delay times** received via objects are to be retained. The parameter is only taken into consideration if the setting via object is activated below. Please note that the setting "After power supply restoration and pro-

gramming" should not be used for the initial start-up, as the factory settings are always used until the first communication (setting via objects is ignored).
Set the threshold value directly in the application program using parameters, or define them via the bus using a communication object.

Threshold value setting using parameter:

Set the threshold values and hysteresis directly.

Threshold value setting using	**Parameter** • Communication objects
Threshold value in 0.1% RH (*valid until 1st communication)*	0 ... 100; 70

Threshold value setting using a communication object:

Define, how the threshold value is to 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 communication with a new threshold value. For units which have already been taken into service, the last communicated threshold value can be used. Basically, a humidity range is specified 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, so that it is retained in the event of a power supply failure and will be available once the power supply is restored.

Threshold value setting using	Parameter • **Communication objects**
The value communicated last shall be maintained	• never • after power supply restoration • after power supply restoration and programming
Starting threshold value in 0.1% RH valid until first communication	0 ... 100; 70
Object value limit (min.) in 0.1%RH	0...100
Object value limit (max.) in 0.1%RH	0...100
Type of threshold value change	Absolute value • Increase/Decrease
Increment *(upon increase/decrease change)*	1,00% • 2,00% • 5,00% • 10,00%

Set the **hysteresis** independent of the type of threshold value specification.

Hysteresis of the threshold value in % (relative to the threshold value)	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 + hyst. above = 0 • TV below = 0 |TV + hyst. above = 1
Delays can be set via objects (in seconds)	No • Yes
Switching delay from 0 to 1 *(If delay can be set via objects: valid until 1st communication)*	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching delay from 1 to 0 *(If delay can be set via objects: valid until 1st communication)*	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
Cycle *(is only sent if periodically is selected)*	5 s • 10 s • 30 s... • 2 h

Block

The switching output can be blocked using an object.

Use switching output block	No • Yes

If the block is activated, define specifications here for the behaviour of the output when blocked.

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 communication	0 • 1
Behaviour of the switching output	
On block	• 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

5.8. Humidity PI control

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

Use humidity control	No • Yes

General control

Sensor KNX TH-UP gl can be used to control one- or two-level dehumidification or combined humidification/dehumidification.

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

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

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

Specify when the current control variables are to be sent to the bus. Periodic sending is safer, in case a message does not reach a recipient. You may also set up periodic monitoring using an actuator with this setting.

Send control variable	• on change • on change and periodically
from change (in % absolute)	1 ... 20, 2
Send cycle *(is only sent if "periodically" is selected)*	5 s • ... • 5 min • ... • 2 h

The status object shows the current status of the output variable (0 = OFF, >0 = ON) and can for example be used for visualisation.

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 only sent if "periodically" is selected)*	5 s • ... • 5 min • ... • 2 h

Controller setpoint

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

During initial commissioning, a **setpoint value** must be defined which is valid until the first communication of a new setpoint value. For units which have already been taken into service, the last communicated setpoint value can be used. Basically, an air humidity range is specified in which the setpoint value can be changed (**object value limit**).

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

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

Setpoint value setting using parameter:

Set the threshold values and hysteresis directly.

Setpoint value setting using	**Parameter** • Communication objects
Setpoint value in 0.1% RH (valid until 1st communication)	0 ... 100; 70

Setpoint value setting using communication object:

Setpoint value setting using	Parameter • **Communication objects**
The value communicated last shall be maintained	• never • after power supply restoration • after power supply restoration and programming
Start setpoint in % valid until first communication *(not upon saving the setpoint value after programming)*	0 ... 100; 50
	0...100; 40
Object value limit (min.) in %	0...100; 60

Object value limit (max.) in %	Absolutwert • Anhebung / Absenkung
	1,00% • 2,00% • 5,00% • 10,00%

In "Humidification and dehumidification" control mode, a dead zone is specified so that a direct changeover switching between humidification and dehumidification can be avoided.

Dead zone between humidification and dehumidification in % *(only if both humidification and dehumidification are used)*	0...50; 15

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

Dehumidification and/or humidification

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

For dual-level dehumidification, the setpoint value difference between the two levels must be defined, i.e. the setpoint value which, when exceeded, triggers the switch to the 2nd level.

Target value difference between level 1 and 2 in % *(for level 2 only)*	0...50; 15

Determine the deviation from the setpoint value 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 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 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 shall	• not be sent • send a specific value
Value in % (*if a value is sent)*	0...100

5.9. Dewpoint measurement

The **Sensor KNX TH-UP gl** calculates the dewpoint temperature and can output the value to the bus.

Use dewpoint temperature	No • Yes
Sending pattern	• never • periodically • on change • on change and periodically
At and above 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 the monitoring of the coolant temperature if required. The menus for setting the monitoring are displayed.

Use monitoring of the coolant temperature	No • Yes

5.9.1. Cooling medium temp. monitoring

A threshold value can be set for the temperature of the coolant, which is based on the current dewpoint temperature (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 temperature + offset

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

The offset communicated last shall be maintained	• never • after power supply restoration • after power supply restoration and programming

During initial commissioning, an **offset** must be defined which is valid until the first communication of 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, so that it 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 communication	0...20; 3
Increment for offset change via 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 % *(for setting in %)*	0 ... 50; 20
Threshold value sends	• never • periodically • on change • on change and periodically
At and above 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

Switching output

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 + hyst. above = 0 • TV below = 0 |TV + hyst. above = 1
Delays can be set via objects (in seconds)	No • Yes
Switching delay from 0 to 1 *for setting via objects:* *valid until 1st communication*	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching delay from 1 to 0 *for setting via objects:* *valid until 1st communication*	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 cycle *(is only sent 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 communication	0 • 1
Behaviour of the switching output	
On block	• 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

5.10. Absolute humidity

The absolute air humidity value is detected by the **KNX AQS/TH-UP Touch** and can be output to the bus.

Use absolute humidity	No • Yes

Sending pattern	• never • periodically • on change • on change and periodically
At and above change of *(if sent on change)*	0,1 g • 0,2 g • 0,5 g • 1,0 g • 2,0 g • 5,0 g
Send cycle *(if sent periodically)*	5 s • 10 s • 30 s... • 2 h

5.11. Comfort field

The **Sensor KNX TH-UP gl** 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
Sending pattern	• never • periodically • on change • on change and periodically
Send cycle *(if sent periodically)*	5 s • 10 s • 30 s... • 2 h

Define the comfort field by specifying the minimum and maximum values for temperature and humidity. The specified standard values comply with 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

5.12. Variable comparator

The two integrated control variable comparators can output maximum, minimum and median values.

Use comparator 1/2	No • Yes

5.12.1. Control variable comparator 1/2

Determine what the control variable comparator should output, and activate the input objects to be used. Send behaviour and blocks can also be set.

Output delivered	• Maximum value • Minimum value • Average value
Use input 1/2/3/4/5	No • Yes

Output sends	• on change of output • on change of output and periodically • when receiving an input object • when receiving an input object and periodically
From change of *(is only sent if "on change" is selected)*	1% • 2% • 5% • 10% • 20% • 25%
Send cycle *(is only sent if "periodically" is selected)*	5 s • 10 s • 30 s • ... • 5 min • ... • 2 h
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 1st communication	0 • 1
Behaviour of the switching output	
With blocking	• do not send message • Send value
Sent value in %	0 ... 100

5.13. Logic

The device has 16 logic inputs, four AND- and four OR-logic gates.

Activate the logic inputs and assign object values up to 1st communication. Then, activate the required logic outputs.

Use logic inputs	Yes • No
Object value before 1st communication for	
- Logic input 1	0 • 1
- Logic input ...	0 • 1
- Logic input 16	0 • 1

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

5.13.1. 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 - Logic inputs 1...16 - Logic inputs 1...16 inverted • all switching events that the device provides (see *Connection inputs of the AND/OR logic*)
Output type	• a 1-Bit-object • two 8-bit objects

If the **output type is a 1-bit object**, set the output values for the various conditions.

Output value if logic = 1	1 • 0
Output value if logic = 0	1 • 0

If the **output type is two 8-bit objects**, set the type of object and the output values for the various conditions.

Object type	• Value (0…255) • Percent (0…100%) • Angle (0…360°) • Scene call-up (0…127)
Output value object A if logic = 1	0 … 255 / 100% / 360° / 127; 1
Output value object B if logic = 1	0 … 255 / 100% / 360° / 127; 1
Output value object A if logic = 0	0 … 255 / 100% / 360° / 127; 0
Output value object B if logic = 0	0 … 255 / 100% / 360° / 127; 0

Set the output send pattern.

Send pattern	• 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 • on change of logic+object receipt • on change of logic+object receipt and periodically
Send cycle *(if sent periodically)*	5 s • 10 s • ... • 2 h

Block

If necessary, activate the block for the logic output and set what a 1 or 0 at the block input means and what happens in the event of a block.

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
Behaviour of switching output	
On block	• Do not send message • Transmit block value [see above, Output value if blocking active]
On release (with 2 seconds release delay)	[send value for current logic status]

5.13.2.Connection inputs of the AND logic

do not use
Logic input 1
Logic input 1 inverted
Logic input 2
Logic input 2 inverted
Logic input 3
Logic input 3 inverted
Logic input 4
Logic input 4 inverted
Logic input 5
Logic input 5 inverted
Logic input 6
Logic input 6 inverted
Logic input 7
Logic input 7 inverted
Logic input 8
Logic input 8 inverted
Logic input 9

Logic input 9 inverted
Logic input 10
Logic input 10 inverted
Logic input 11
Logic input 11 inverted
Logic input 12
Logic input 12 inverted
Logic input 13
Logic input 13 inverted
Logic input 14
Logic input 14 inverted
Logic input 15
Logic input 15 inverted
Logic input 16
Logic input 16 inverted
Temperature/Humidity sensor malfunction = ON
Temperature/Humidity sensor malfunction = OFF
Switching output temperature 1
Switching output temperature 1 inverted
Switching output temperature 2
Switching output temperature 2 inverted
Switching output temperature 3
Switching output temperature 3 inverted
Comfort temperature controller active
Comfort temperature controller inactive
Eco temperature controller active
Eco temperature controller inactive
Standby temperature controller active
Standby temperature controller inactive
Temperatur controller frost/heat active
Temperatur controller frost/heat inactive
Temp. control status heating 1
Temp. control status heating 1 inverted
Temp. control status heating 2
Temp. control status heating 2 inverted
Temp. control status cooling 1
Temp. control status cooling 1 inverted
Temp. control status cooling 2
Temp. control status cooling 2 inverted
Switching output humidity 1
Switching output humidity 1 inverted
Switching output humidity 2
Switching output humidity 2 inverted
Humidity control status dehumidification 1
Humidity control status dehumidification 1 inv.
Humidity control status dehumidification 2
Humidity control status dehumidification 2 inv.

Humidity control status humidification
Humidity control status humidification inverted
Switching output coolant temperature
Switching output coolant temperature inverted
Switching output cooling medium temperature
Switching output cooling medium temperature inv.
Switching output room climate status
Switching output room climate status inverted

5.13.3. Connection inputs of the OR logic

The OR logic connection inputs correspond to those of the AND logic. In addition the following inputs are available for the OR logic:

AND logic 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

Elsner Elektronik GmbH Control and Automation Engineering
Sohlengrund 16
75395 Ostelsheim
Germany
Phone +49 (0) 70 33 / 30 945-0 info@elsner-elektronik.de
Fax +49 (0) 70 33 / 30 945-20 www.elsner-elektronik.de