KNX EN

KNX AQS/TH-B-UP

Combined Indoor Sensor

Item numbers 70239 (white), 70240 (aluminium-coloured), 70241 (anthracite), 70242 (stainless steel coloured)

elsner elektronik

Installation and Adjustment

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 AQS/TH-B-UP** measures CO_2 concentration, 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 AQS/TH-B-UP** offers two push buttons that may be used for changing the ambient temperature (target value), for switching between operating modes or as free programmable bus push buttons.

The **KNX AQS/TH-B-UP** 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 CO_2 concentration and air humidity) and a heating/cooling system (depending on temperature). The **KNX AQS/TH-B-UP** can emit a warning to the bus as soon as the area of optimum comfort (according to DIN 1946) is left.

The integrated display shows the own values and data received from the bus (e.g. date, time). The housing is completed with a frame of the switching series installed in the building and thus merges with the interior.

Functions:

- Measurement of **CO_2 concentration** of the air, 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)
- **Display** 1-3 rows (own values or values received from the bus) or display of temperature control (see *Mode display and manual temperature controller*, page 10)
- **2 push buttons**. Configuration as bus push button or for changing ambient temperature and switching between operating modes (see *Change ambient temperature with the buttons*, page 12)
- **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 and CO_2 concentration: dehumidification/humidification (one step) or dehumidification (one or two step)
- **Switching outputs** with adjustable threshold values: 3 × temperature, 2 × humidity, 4 × CO_2. Threshold values can be set by parameter or via communication objects
- **8 AND and 8 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

- **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. The **product file** can be downloaded from the Elsner Elektronik website on **www.elsner-elektronik.de** in the "Service" menu.

1.0.1. Scope of delivery

- Housing with display, buttons and sensor board
- CO_2 sensor unit
- 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	Plastic material (partly lacquered)
Colours	• White glossy (similar to RAL 9016 Traffic White) • Aluminium matt • Anthracite matt • Stainless steel • Special colours on request
Mounting	In-wall (in socket Ø 60 mm, 42 mm deep)
Protection category	IP 20
Dimensions	Housing approx. 55 x 55 (W x H, mm), mounting depth approx. 15 mm, base plate approx. 71 x 71 (W x H, mm)
Total weight	approx. 72 g
Ambient temperature	Operation -10…+50°C, storage -20…+60°C
Ambient air humidity	max. 95% R. H., 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	253
CO_2 measurement range	0...2000 ppm
CO_2 resolution	1 ppm
CO_2 accuracy*	± 50 ppm ± 3% of the measuered value

Temperature measurement range	-10...+50°C
Temperature resolution	0.1°C
Temperature accuracy*	± 0,5°C at -10…+50°C
Humidity measurement range	0% R.H. …90% R.H.
Humidity resolution	0.1%
Humidity accuracy	±7,5% R.H. at 0...10% R.H. ±4,5% R.H. at 10...90% R.H.
Humidity drift	± 0.5% R.H. per year in normal air

* Mind the notes on *Accuracy of the measurement*, page 7

The product conforms with the provisions of EU guidelines.

1.1.1. Accuracy of the measurement

Measurement variations from sources of interference (see chapter *Installation position*) must be corrected in the ETS in order to ensure the specified accuracy of the sensor (offset). To ensure a correct CO_2 measurement, the device must be installed in a windproof socket.

The indicated **accuracy of the CO_2 measurement** will be achieved after a run-in period of 24 hours (without interruption of the bus voltage) if the sensor has been in contact with fresh air (350…450 ppm) at least once in this period.
After this, the CO_2 sensor will recalibrate every two weeks by defining the lowest measured value captured during that period (without interruption of the bus voltage) as a reference for fresh air.
The guarantee the accuracy on a sustained basis, the sensor should be provided with fresh air at least once in two weeks. This occurs normally during room ventilation.

When **measuring temperature**, the self-heating of the device is considered by the electronics. The heating is compensated by reducing the measured temperture by the self-heating of 1.8°C. The indicated indoor temperature measured value approches the actual room temperature during a 2 hours heating period.

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 AQS/TH-B-UP** will be installed concealed within a socket (Ø 60 mm, 42 mm deep).

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

For monitoring of the CO_2 content of the room air choose an installation position in height of head (standing or sitting, according to utilization of room). The CO_2 concentration in indoor rooms is highest near the floor and decreases towards the ceiling.

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

To ensure a correct CO_2 measurement, the device must be installed in a windproof socket.

2.3. Composition

2.3.1. Housing

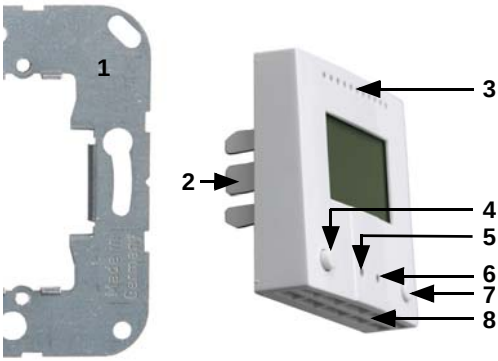


Fig. 1
1 Base plate
2 Catches
3 Openings for air circulation
4 Push button
5 Programming LED (recessed)
6 Programming button (recessed) for teaching device
7 Push button
8 Openings for air circulation (LOWER)

2.3.2. Rear view of sensor board with connections

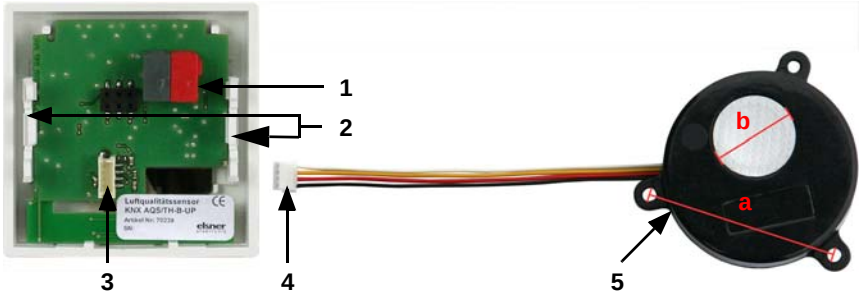


Fig. 2
1 KNX terminal BUS +/-
2 Notches
3 Slot for CO_2 sensor unit
4 Plug of CO_2 sensor unit
5 CO_2 sensor unit

Lenght of cable approx. 110 mm
a Hole centre distance approx. 43 mm
b Diameter of diaphragm approx. 18 mm

2.4. Assembly of the sensor

First of all fit the windproof socket with connection. Also seal inlet pipes to avoid infiltration.

Place the CO_2 sensor unit in the socket. The side with the sensor membrane must face to front.

Fig. 3

Screw the base plate onto the socket and position the frame of the switching programme. Connect the CO_2 sensor unit and the bus line +/- (black-red plug) to the terminals provided on the board.

Pin the sensor with the notches on to the metal frame, so that sensor and frame are fixed.

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. Display and operation at the device

Specifications for the display are set in the ETS and the use of the push buttons is permitted or disabled.

Basically the display can show a two-row or three-row text (e. g. for measured values) or a tempertuare controller. You can switch between the two types by pressing one of the buttons, if this has not been disabled in the ETS.

3.1. Mode display and manual temperature controller

Depending on the ETS setting selected, the mode display will only display show the current target value, or the base target value setting with scale display. The manually adjustable range can be set in the ETS.

The following display options are available:

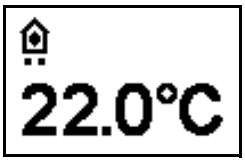


Fig. 4
Mode display with current target value and/or base target value

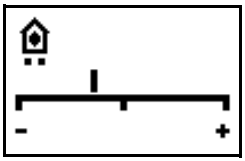


Fig. 5
Mode display with scale display for adjusting the base target value.
The control position in the image reads "Base target value reduced".

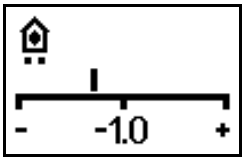


Fig. 6
Mode display with scale display and number.
Shows the set target value change.
The control position in the image reads "Base target value reduced to 1.0°".

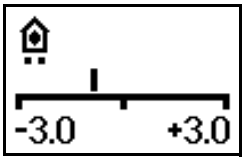


Fig. 7
Mode display with scale display and range.
Shows the possible adjustment range (as set in the ETS).
The control position in the image reads "Base target value reduced".

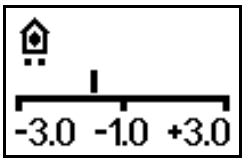


Fig. 8
Mode display with scale display, range and number.
Displays the possible adjustment range (as set in the ETS) and the set target value change.
The control position in the image reads "Base target value reduced to 1.0°".

Symbols

	Comfort mode. Comfort (present) target temperature will be used.		Standby mode. Standby (absent during day) target temperature will be used.
	Eco mode. Night target temperature will be used.		Building protection mode. Building protection target temperature will be used. The symbol will blink when the mode has been activated but the activation delay has not yet expired.
	Heating mode. Heating will be provided.		Cooling mode Cooling will be provided.

Priority (points)

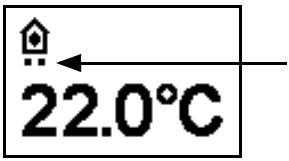


Fig. 9
In "HVAC mode with 2x 8 bits" control mode, points are shown under the symbol, to indicate the running priority of the current mode.

One point: Priority 1/priority control. It is not possible to adjust the temperature automation system manually. Neither the target temperature nor the operating modes can be changed using the buttons on the unit.

Two points: Priority 2. The target temperature and operating mode can be changed using the buttons.

3.2. Change ambient temperature with the buttons

If the mode display is active, the target ambient temperature and the operating mode can be changed manually using the buttons. The button functions can be blocked in the ETS or be suppressed for Priority 1 operating modes. The individual operating modes can also be locked for manual selection in the ETS.

Decrease target temperature (-)	briefly press left button	Ambient temperature in the current mode is decreased. The sep-size is defined in the ETS (0.1°C to 5°C).
Increase target temperature (+)	briefly press right button	Ambient temperature in the current mode is increased. The sep-size is defined in the ETS (0.1°C to 5°C).

Change mode	press left or right button longer than 2 secs.	Changes between the operating modes Comfort, Standby, Eco and Building Protection (if deblocked in the ETS).
Extend Comfort mode	in Eco mode: press both buttons at the same time longer than 2 secs.	Switches from Eco to Comfort mode again for a certain time (e. g. if the rooms are used longer in the evening). The period is defined in the ETS (up to 10 hours). The time remaining in Comfort mode is displayed.

4. Transfer protocol

Units:

Temperatures in degrees Celsius
Air humidity in %
Absolute air humidity in g/kg and/or g/m^3
CO_2 content in ppm
Variables in %

4.1. List of all communications objects

Abbreviation flags:

C Communication
R Read
W Write
T Transfer
U Update

No.	Name	Function	DPT	Flags
0	Software version	readable	217,001	C R T
1	Temperature/humidity malfunction sensor	Output	1,001	C R T
2	CO2 sensor malfunction	Output	1,001	C R T
3	Outside temperature reading	Input	9,001	C W
4	Inside temperature reading	Output	9,001	C R T
5	Overall temperature reading	Output	9,001	C R T
6	Min./max. temperature value request	Input	1,017	C W
7	Minimum temperature reading	Output	9,001	C R T
8	Maximum temperature reading	Output	9,001	C R T
9	Reset min./max. temperature value	Input	1,017	C W
10	Temp. threshold value 1: Absolute value	Input/Output	9,001	C R W T U
11	Temp. threshold value 1: (1:+ | 0:-)	Input	1,002	C W
12	Temp. threshold value 1: Switching delay from 0 to 1	Input	7,005	C W
13	Temp. threshold value 1: Switching delay from 1 to 0	Input	7,005	C W
14	Temp. threshold value 1: Switching output	Output	1,001	C R T
15	Temp. threshold value 1: Switching output block	Input	1,002	C W

No.	Name	Function	DPT	Flags
16	Temp. threshold value 2: Absolute value	Input/Output	9,001	C R W T U
17	Temp. threshold value 2: (1:+ | 0:-)	Input	1,002	C W
18	Temp. threshold value 2: Switching delay from 0 to 1	Input	7,005	C W
19	Temp. threshold value 2: Switching delay from 1 to 0	Input	7,005	C W
20	Temp. threshold value 2: Switching output	Output	1,001	C R T
21	Temp. threshold value 2: Switching output block	Input	1,002	C W
22	Temp. threshold value 3: Absolute value	Input/Output	9,001	C R W T U
23	Temp. threshold value 3: (1:+ | 0:-)	Input	1,002	C W
24	Temp. threshold value 3: Switching delay from 0 to 1	Input	7,005	C W
25	Temp. threshold value 3: Switching delay from 1 to 0	Input	7,005	C W
26	Temp. threshold value 3: Switching output	Output	1,001	C R T
27	Temp. threshold value 3: Switching output block	Input	1,002	C W
28	Reserve			
29	TR_1_ Eco-Standby HVAC 1	Input	1,003	C W
30	TR_1_ Comfort Activation HVAC 2	Input	1,003	C W
31	TR_1_ Frost/Heat activation	Input	1,003	C R W T
32	TR_1_ Blocking object	Input	1,003	C W
33	TR_1_ Target value, current	Output	9,001	C R T
34	TR_1_ Switching object (0:Heat | 1:Cool)	Input	1,002	C W
35	TR_1_ Target value, comfort heating	Input/Output	9,001	C R W T
36	TR_1_ Target value, comfort heating (1:+ | 0:-)	Input	1,002	C W
37	TR_1_ Target value, comfort cooling	Input/Output	9,001	C R W T
38	TR_1_ Target value, comfort cooling (1:+ | 0:-)	Input	1,002	C W
39	TR_1_ Target value_Basic offset	Input/Output	9,001	C R W T
40	TR_1_ Target value, Standby heating	Input/Output	9,001	C R W T
41	TR_1_ Target value, Standby heating (1:+ | 0:-)	Input	1,002	C W
42	TR_1_ Target value, Standby cooling	Input/Output	9,001	C R W T

No.	Name	Function	DPT	Flags
43	TR_1_ Target value, Standby cooling (1:+ | 0:-)	Input	1,002	C W
44	TR_1_ Target value, Eco heating	Input/Output	9,001	C R W T
45	TR_1_ Target value, Eco heating (1:+ | 0:-)	Input	1,002	C W
46	TR_1_ Target value, Eco cooling	Input/Output	9,001	C R W T
47	TR_1_ Target value, Eco cooling (1:+ | 0:-)	Input	1,002	C W
48	TR_1_ Control variable heating (stage 1)	Output	5,001	C R T
49	TR_1_ Control variable heating stage 2	Output	5,001	C R T
50	TR_1_ Control variable cooling (stage 1)	Output	5,001	C R T
51	TR_1_ Control variable cooling stage 2	Output	5,001	C R T
52	TR_1_ Status heating 1 (1=ON | 0=OFF)	Output	1,002	C R T
53	TR_1_ Status heating 2 (1=ON | 0=OFF)	Output	1,002	C R T
54	TR_1_ Cooling status 1 (1=ON | 0=OFF)	Output	1,002	C R T
55	TR_1_ Cooling status 2 (1=ON | 0=OFF)	Output	1,002	C R T
56	TR_1_ Comfort Delay Status	Input/Output	1,002	C R W T
57	TR_1_Comfort extension time (in sec)	Input/Output	7,005	C R W T
58	TR_1_Belimo_Control variable	Output	5,001	C R T
59	Outside humidity reading	Input	9,007	C W
60	Inside humidity reading	Output	9,007	C R T
61	Overall humidity reading	Output	9,007	C R T
62	Min./max. humidity value request	Input	1,017	C W
63	Minimum humidity reading	Output	9,007	C R T
64	Maximum humidity reading	Output	9,007	C R T
65	Reset min./max. humidity value	Input	1,017	C W
66	Humidity threshold value 1: Absolute value	Input/Output	9,007	C R W T U
67	Humidity threshold value 1: (1:+ | 0:-)	Input	1,002	C W
68	Humidity threshold value 1: Switching delay from 0 to 1	Input	7,005	C W
69	Humidity threshold value 1: Switching delay from 1 to 0	Input	7,005	C W

No.	Name	Function	DPT	Flags
70	Humidity threshold value 1: Switching output	Output	1,001	C R T
71	Humidity threshold value 1: Switching output block	Input	1,002	C W
72	Humidity threshold value 2: Absolute value	Input/Output	9,007	C R W T U
73	Humidity threshold value 2: (1:+ | 0:-)	Input	1,002	C W
74	Humidity threshold value 2: Switching delay from 0 to 1	Input	7,005	C W
75	Humidity threshold value 2: Switching delay from 1 to 0	Input	7,005	C W
76	Humidity threshold value 2: Switching output	Output	1,001	C R T
77	Humidity threshold value 2: Switching output block	Input	1,002	C W
78	Humidity controller: Blocking object	Input	1,002	C W
79	Humidity controller: Target value	Input/Output	9,007	C R W T
80	Humidity controller: Target value (1:+ | 0:-)	Input	1,002	C W
81	Humidity controller: Control variable dehumidification (stage 1)	Output	5,001	C R T
82	Humidity controller: Control variable dehumidification stage 2	Output	5,001	C R T
83	Humidity controller: Control variable humidification	Output	5,001	C R T
84	Humidity controller: Dehumidification 1 status (1=ON | 0=OFF)	Output	1,001	C R T
85	Humidity controller: Dehumidification 2 status (1=ON | 0=OFF)	Output	1,001	C R T
86	Humidity controller: Humidification status (1=ON | 0=OFF)	Output	1,001	C R T
87	Dewpoint temperature	Output	9,001	C R T
88	Coolant temp.: Threshold value	Output	9,001	C R T
89	Coolant temp.: Actual value	Input	9,001	C W
90	Coolant temp.: Offset change (1:+ | 0:-)	Input	1,002	C W
91	Coolant temp.: Switching delay from 0 to 1	Input	7,005	C W
92	Coolant temp.: Switching delay from 1 to 0	Input	7,005	C W
93	Coolant temp.: Switching output	Output	1,001	C R T

No.	Name	Function	DPT	Flags
94	Coolant temp.: Switching output block	Input	1,002	C W
95	Absolute humidity [g/kg]	Output	14,005	C R T
96	Absolute humidity [g/m³]	Output	14,017	C R T
97	Ambient climate status: 1 = comfortable | 0 = uncomfortable	Output	1,002	C R T
98	Outside CO2 reading	Input	9,008	C W
99	Inside CO2 Internal reading	Output	9,008	C R T
100	Total CO2 reading	Output	9,008	C R T
101	CO2 maximum value request	Input	1,017	C W
102	Maximum CO2 reading	Output	9,008	C R T
103	Reset CO2 maximum value	Input	1,017	C W
104	CO2 threshold value 1: Absolute value	Input/Output	9,008	C R W T U
105	CO2 threshold value 1: (1:+ | 0:-)	Input	1,002	C W
106	CO2 threshold value 1: Switching delay from 0 to 1	Input	7,005	C W
107	CO2 threshold value 1: Switching delay from 1 to 0	Input	7,005	C W
108	CO2 threshold value 1: Switching output	Output	1,001	C R T
109	CO2 threshold value 1: Switching output block	Input	1,002	C W
110	CO2 threshold value 2: Absolute value	Input/Output	9,008	C R W T U
111	CO2 threshold value 2: (1:+ | 0:-)	Input	1,002	C W
112	CO2 threshold value 2: Switching delay from 0 to 1	Input	7,005	C W
113	CO2 threshold value 2: Switching delay from 1 to 0	Input	7,005	C W
114	CO2 threshold value 2: Switching output	Output	1,001	C R T
115	CO2 threshold value 2: Switching output block	Input	1,002	C W
116	CO2 threshold value 3: Absolute value	Input/Output	9,008	C R W T U
117	CO2 threshold value 3: (1:+ | 0:-)	Input	1,002	C W
118	CO2 threshold value 3: Switching delay from 0 to 1	Input	7,005	C W
119	CO2 threshold value 3: Switching delay from 1 to 0	Input	7,005	C W

No.	Name	Function	DPT	Flags
120	CO2 threshold value 3: Switching output	Output	1,001	C R T
121	CO2 threshold value 3: Switching output block	Input	1,002	C W
122	CO2 threshold value 4: Absolute value	Input/Output	9,008	C R W T U
123	CO2 threshold value 4: (1:+ | 0:-)	Input	1,002	C W
124	CO2 threshold value 4: Switching delay from 0 to 1	Input	7,005	C W
125	CO2 threshold value 4: Switching delay from 1 to 0	Input	7,005	C W
126	CO2 threshold value 4: Switching output	Output	1,001	C R T
127	CO2 threshold value 4: Switching output block	Input	1,002	C W
128	CO2 controller: Blocking object	Input	1,002	C W
129	CO2 controller: Target value	Input/Output	9,008	C R W T
130	CO2 controller: Target value (1:+ | 0:-)	Input	1,002	C W
131	CO2 controller: Control variable ventilation (stage 1)	Output	5,001	C R T
132	CO2 controller: Control variable ventilation (stage 2)	Output	5,001	C R T
133	CO2 controller: Ventilation 1 status (1=ON | 0=OFF)	Output	1,001	C R T
134	CO2 controller: Ventilation 2 status (1=ON | 0=OFF)	Output	1,001	C R T
135	Comparator 1 actuating variable: Input 1	Input	5,010	C W
136	Comparator 1 actuating variable: Input 2	Input	5,010	C W
137	Comparator 1 actuating variable: Input 3	Input	5,010	C W
138	Comparator 1 actuating variable: Input 4	Input	5,010	C W
139	Comparator 1 actuating variable: Input 5	Input	5,010	C W
140	Comparator 1 actuating variable: Output	Output	1,001	C R T
141	Comparator 1 actuating variable: Block	Input	1,002	C W
142	Comparator 2 actuating variable: Input 1	Input	5,010	C W

No.	Name	Function	DPT	Flags
143	Comparator 2 actuating variable: Input 2	Input	5,010	C W
144	Comparator 2 actuating variable: Input 3	Input	5,010	C W
145	Comparator 2 actuating variable: Input 4	Input	5,010	C W
146	Comparator 2 actuating variable: Input 5	Input	5,010	C W
147	Comparator 2 actuating variable: Output	Output	1,001	C R T
148	Comparator 2 actuating variable: Block	Input	1,002	C W
149	AND logic 1: 1-bit switching output	Output	1,002	C R T
150	AND logic 1: 8-bit output A	Output	5,010	C R T
151	AND logic 1: 8-bit output B	Output	5,010	C R T
152	AND logic 1: Block	Input	1,002	C W
153	AND logic 2: 1-bit switching output	Output	1,002	C R T
154	AND logic 2: 8-bit output A	Output	5,010	C R T
155	AND logic 2: 8-bit output B	Output	5,010	C R T
156	AND logic 2: Block	Input	1,002	C W
157	AND logic 3: 1-bit switching output	Output	1,002	C R T
158	AND logic 3: 8-bit output A	Output	5,010	C R T
159	AND logic 3: 8-bit output B	Output	5,010	C R T
160	AND logic 3: Block	Input	1,002	C W
161	AND logic 4: 1-bit switching output	Output	1,002	C R T
162	AND logic 4: 8-bit output A	Output	5,010	C R T
163	AND logic 4: 8-bit output B	Output	5,010	C R T
164	AND logic 4: Block	Input	1,002	C W
165	AND logic 5: 1-bit switching output	Output	1,002	C R T
166	AND logic 5: 8-bit output A	Output	5,010	C R T
167	AND logic 5: 8-bit output B	Output	5,010	C R T
168	AND logic 5: Block	Input	1,002	C W
169	AND logic 6: 1-bit switching output	Output	1,002	C R T
170	AND logic 6: 8-bit output A	Output	5,010	C R T
171	AND logic 6: 8-bit output B	Output	5,010	C R T
172	AND logic 6: Block	Input	1,002	C W
173	AND logic 7: 1-bit switching output	Output	1,002	C R T
174	AND logic 7: 8-bit output A	Output	5,010	C R T
175	AND logic 7: 8-bit output B	Output	5,010	C R T
176	AND logic 7: Block	Input	1,002	C W

No.	Name	Function	DPT	Flags
177	AND logic 8: 1-bit switching output	Output	1,002	C R T
178	AND logic 8: 8-bit output A	Output	5,010	C R T
179	AND logic 8: 8-bit output B	Output	5,010	C R T
180	AND logic 8: Block	Input	1,002	C W
181	OR logic 1: 1-bit switching output	Output	1,002	C R T
182	OR logic 1: 8-bit output A	Output	5,010	C R T
183	OR logic 1: 8-bit output B	Output	5,010	C R T
184	OR logic 1: Block	Input	1,002	C W
185	OR logic 2: 1-bit switching output	Output	1,002	C R T
186	OR logic 2: 8-bit output A	Output	5,010	C R T
187	OR logic 2: 8-bit output B	Output	5,010	C R T
188	OR logic 2: Block	Input	1,002	C W
189	OR logic 3: 1-bit switching output	Output	1,002	C R T
190	OR logic 3: 8-bit output A	Output	5,010	C R T
191	OR logic 3: 8-bit output B	Output	5,010	C R T
192	OR logic 3: Block	Input	1,002	C W
193	OR logic 4: 1-bit switching output	Output	1,002	C R T
194	OR logic 4: 8-bit output A	Output	5,010	C R T
195	OR logic 4: 8-bit output B	Output	5,010	C R T
196	OR logic 4: Block	Input	1,002	C W
197	OR logic 5: 1-bit switching output	Output	1,002	C R T
198	OR logic 5: 8-bit output A	Output	5,010	C R T
199	OR logic 5: 8-bit output B	Output	5,010	C R T
200	OR logic 5: Block	Input	1,002	C W
201	OR logic 6: 1-bit switching output	Output	1,002	C R T
202	OR logic 6: 8-bit output A	Output	5,010	C R T
203	OR logic 6: 8-bit output B	Output	5,010	C R T
204	OR logic 6: Block	Input	1,002	C W
205	OR logic 7: 1-bit switching output	Output	1,002	C R T
206	OR logic 7: 8-bit output A	Output	5,010	C R T
207	OR logic 7: 8-bit output B	Output	5,010	C R T
208	OR logic 7: Block	Input	1,002	C W
209	OR logic 8: 1-bit switching output	Output	1,002	C R T
210	OR logic 8: 8-bit output A	Output	5,010	C R T
211	OR logic 8: 8-bit output B	Output	5,010	C R T
212	OR logic 8: Block	Input	1,002	C W
213	Logic input 1	Input	1,002	C W
214	Logic input 2	Input	1,002	C W
215	Logic input 3	Input	1,002	C W

No.	Name	Function	DPT	Flags
216	Logic input 4	Input	1,002	C W
217	Logic input 5	Input	1,002	C W
218	Logic input 6	Input	1,002	C W
219	Logic input 7	Input	1,002	C W
220	Logic input 8	Input	1,002	C W
221	Logic input 9	Input	1,002	C W
222	Logic input 10	Input	1,002	C W
223	Logic input 11	Input	1,002	C W
224	Logic input 12	Input	1,002	C W
225	Logic input 13	Input	1,002	C W
226	Logic input 14	Input	1,002	C W
227	Logic input 15	Input	1,002	C W
228	Logic input 16	Input	1,002	C W
229	Display contrast (1 = higher | 0 = lower)	Input	1,002	C R W
230	Date for display	Input	11,001	C U W
231	Time for display	Input	10,001	C U W
232	8-bit object 1 for display	Input	5.xxx	C R W
233	8-bit object 2 for display	Input	5.xxx	C R W
234	8-bit object 3 for display	Input	5.xxx	C R W
235	16-bit object 1 for display	Input	9.xxx	C R W
236	16-bit object 2 for display	Input	9.xxx	C R W
237	Text message 1 for display	Input	16,000	C R W
238	Text message 2 for display	Input	16,000	C R W
239	Display_Return approval	Input	1,001	C W
240	Pushbutton 1 long-term	Output	1,008	C R T
241	Pushbutton 1 short-term	Output	1,010	C R T
242	Pushbutton 1 switching	Input/Output	1,001	C R W T
243	Pushbutton 1 Relative dimming	Input/Output	3,007	C R W T
244	Pushbutton 1 encoder 8 bit	Output	5*	C R T
245	Pushbutton 1 encoder 16 bit	Output	9*	C R T
246	Pushbutton 1 Scenario	Output	18,001	C R T
247	Pushbutton 2 long-term	Output	1,008	C R T
248	Pushbutton 2 short-term	Output	1,010	C R T
249	Pushbutton 2 switching	Input/Output	1,001	C R W T
250	Pushbutton 2 Relative dimming	Input/Output	3,007	C R W T
251	Pushbutton 2 encoder 8 bit	Output	5*	C R T
252	Pushbutton 2 encoder 16 bit	Output	9*	C R T
253	Pushbutton 2 Scenario	Output	18,001	C R T

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. The "Software version" communications object is sent once after 5 seconds.

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
Use CO2 malfunction object	Yes • No

5.3. Measured values: Temperature, humidity, CO2

The setting options for temperature, humidity and CO2 readings are the same.

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

Temperature: Offset in 0.1°C	-50…50; 0
Humidity: Offset in % rH	-10...10; 0
CO2: Offset in ppm	-100...100; 0

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

Use external reading	Yes • No

Ext. Reading proportion of the total reading	5% • 10% • ... • 50% • ... • 100%
Send internal and total reading	• never • periodically • On change • on change and periodically
From change of *(if sent on change)*	*Temperature:* 0.1°C • 0.2°C • ... • 5.0°C *Humidity:* 0.10% • ... • 1.00% • ... • 25.00% *CO2:* 2% • 5% • 10% • 25% • 50% (relative to the last reading)
Send cycle *(if sent periodically)*	5 s • ... • 2 h

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

The **minimum and maximum readings** can be saved and sent to the bus (maximum value only for CO2). |||Use the "Reset temperature (and/or humidity, CO_2) min/max. value" objects to reset the values to the current readings.

Use minimum/maximum value	Yes • No

Note: The values are not retained after a reset.

5.4. Threshold values: Temperature, humidity, CO2

Activate the threshold values that you want to use here. The **Sensor KNX AQS/TH-B-UP** provides three threshold values for temperature, two threshold values for air humidity and four threshold values for carbon dioxide.

Use threshold value 1/2/3/4	Yes • No

Table of CO2 values:

1000 ppm corresponds to 0.1% CO2 content.

300 ... 500 ppm	Fresh air
1500 ... 3000 ppm	"Stale" air
5000 ppm	Maximum allowable concentration

5.4.1. Threshold value 1, 2, 3, 4: Temperature, humidity, CO2

The settings options for temperature, humidity and CO2 threshold values are the same.

Threshold value

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

Threshold value setpoint using parameter:

Set the threshold values and hysteresis directly.

Threshold value setpoint using	**Parameter** • Communications object
Temperature: Threshold value in 0.1°C *Humidity:* Threshold value in % rH *CO2:* Threshold value in ppm	-300 … 800; 200 0...100; 70 0...5000; 1200
Hysteresis of the threshold value in %	0 … 50; 20

Threshold value setpoint using a communications object:

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

During initial commissioning, a threshold value must be defined which will be valid until the 1st communication of a new threshold value. For units which have already been taken into service, the last communicated threshold value can be used. Basically, a temperature range is given in which the threshold value can be changed (object value limit).

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

Threshold value setpoint using	Parameter • **Communications object**
The last communicated value should be retained	• never • after restoration of power • after restoration of power and programming
Start threshold value *Temperature:* in 0.1°C *Humidity:* in % rH *CO2:* in ppm valid till 1st communication	-300 … 800; 200 0...100; 70 0...5000; 1200
Object value limit (min) *Temperature:* in 0.1°C *Humidity:* in % rH *CO2:* in ppm	-300…800 0...100 0...5000
Object value limit (max) *Temperature:* in 0.1°C *Humidity:* in % rH *CO2:* in ppm	-300…800 0...100 0...5000
Type of threshold change	Absolute value • Increase/decrease
Step size *(upon increase/decrease change)*	*Temperature:* 0.1°C • ... • 1°C • ... • 5°C *Humidity:* 1.00% • 2.00% • 5.00% • 10.00% *CO2:* 1 • 2 • 5 • 10 • 20 • 50 • 100 • 200
Hysteresis of the threshold value in %	0 … 50; 20

Switching output

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

When the following conditions apply, the output is (LV = Threshold value)	• LV above = 1 |LV - hysteresis below = 0 • LV above = 0 |LV - hysteresis below = 1 • LV below = 1 |LV + hysteresis above = 0 • LV below = 0 |LV + hysteresis above = 1
Delays can be set via objects (in seconds)	No • Yes
Switching delay from 0 to 1 *(when delay is not set using objects)*	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching delay from 1 to 0 *(when delay is not set using objects)*	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

Block

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 1st communication	0 • 1
Behaviour of the switching output	
With blocking	• Do not send message • send 0 • send 1
On release (with 2 seconds release delay)	[Dependent on the "Switching output sends" setting]

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

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

Switching output sends on change and periodically	Send switching output status
Switching output sends on change to 1 and periodically	If switching output = 1 ➔send 1
Switching output sends on change to 0 and periodically	If switching output = 0 ➔send 0

5.5. Temperature PI control

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:

ID	Name	Encoding	Range	Use
20,102	DPT_HVACMode	field1 = HVACMode 0 = Auto 1 = Comfort 2 = Standby 3 = Economy 4 = Building Protection	[0 … 4]	HVAC

Alternatively, you can use three objects, with one object switching between eco and standby mode and the two others are used to activate comfort mode or frost/heat protection mode. The comfort object then blocks the eco/standby object, and frost/heat protection objects have 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 block of the temperature control by the blocking object.

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

Determine when the current settings of the controls are to be transmitted to the bus. Periodic transmission is safer if a message does not reach a recipient. You may also set up periodical monitoring by the actuator with this setting.

Send actuating variables	• on change • on change and periodically
cycle *for periodical transmission only*	5 s • ... • 5 min • ... • 2 h

The status object shows the current status of the output variable (0 = OFF, >0 = ON) and may, for example, be used for visualisations or to switch off the heating pump as soon as the heating is 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 *for periodical transmission only*	5 s • ... • 5 min • ... • 2 h

Then define the type of setting. Heating and/or cooling may be controlled in two levels.

Type of control	• One-stage heating • Dual-speed heating • Single-speed cooling • Dual-stage cooling • Single-speed heating + Single-speed cooling • Dual-speed heating + Single-speed cooling • Dual-speed heating + Dual-speed cooling

5.5.1. 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).

Setting the nominal values	• separate with switching object • separate without switching object • with comfort set point as a basis
Behaviour of the switching object at value *only if switching object is used*	• 0 = Heating | 1 = Cooling • 1 = Heating | 0 = Cooling
Switching object value before 1st communication *only if switching object is used*	0 • 1

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) and comfort extension time	• not • after voltage recovery • after voltage recovery and programming (do not use for first start-up!)

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

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 set point is used as the basis, a dead zone is determined for the control mode "heating *and* cooling" to avoid direct switching from heating to cooling.

Dead zone between heating and cooling *only if both heating AND cooling are used.*	1…100; 50

Set point for standby

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

If set point values are entered separately:

A starting set point value is defined 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	-300…800; 210
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 set point value is used as a basis:

If the comfort set point value is used as a basis, the deviation from this value is set.

Reduce nominal heating value (in 0.1°C) *for heating*	0…200; 30
Increase nominal cooling value\r\n (in 0.1°C) *for cooling*	0…200; 30

Eco set point

Eco mode is usually used for night mode.

If set point values are entered separately:

A starting set point value is defined 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	-300…800; 210
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 set point value is used as a basis:

If the comfort set point value is used as a basis, the deviation from this value is set.

Reduce nominal heating value (in 0.1°C) *for heating*	0…200; 50
Increase nominal cooling value\r\n (in 0.1°C) *for cooling*	0…200; 60

Set point values for frost/heat protection (building protection)

The building protection mode is used during longer absences. Set points 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.

Nominal value frost protection\r\n (in 0,1°C)	-300…800; 70
Nominal value heat protection (in 0,1°C)	-300…800; 350
Activation delay	no • 5 s • ... • 5 min • ... • 2 h

General variables

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

For heating and cooling	• separate variables are used • common variables are used for Level 1 • common variables are used for Level 2 • common variables are used for Level 1+2
Control type *only for level 2*	• 2-point control • PI control
Regulating variable of the 2nd Stage is on *only for level 2*	• 1-bit object • 8-bit object

5.5.2. Heating control level 1/2

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

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

On the 2nd level (therefore only in case of a 2 level heating), heating is controlled via a PI or a 2-point-control.

On level 2, the set point deviation between the two levels must furthermore be determined, i. e. the lowest set point value from which the 2nd level is then added (when values exceed this set point).

Set point difference between levels 1 and 2 (in 0.1°C) *only for level 2*	0…100; 40
Control type *only for level 2 and if no common variables are used*	• 2-point control • PI control

PI control with control parameters:

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

Control type	**• PI control**
Set control using	**• Controller parameter** • provided applications

Determine the deviation from the set point value which reaches maximum variable value, i. e. the point at which maximum heating power is activated.
The reset time shows how quickly the controls react to deviations from the set point value. In case of a short reset time, the controls react with a fast increase of the variable. In case of a long reset time, the controls react somewhat more gently and needs longer until the necessary variable for the set point deviation is reached.
You should set the time appropriate to the heating system at this point (note manufacturer instructions).

Maximum control variable is reached at set point/actual difference of (in °C)	0...5
Reset time (in min.)	1…255; 30

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

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

In case of a common 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**
Set control using	• Controller parameter **• provided applications**

Application	• Warm water heating • Floor heating • Convection unit • Electric heating
Maximum control variable is reached at set point/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 determine what should be transmitted when the control is blocked. Set a value greater 0 (=OFF) to receive a basic heating level, e.g. for floor heating.
Upon release, the control variable follows the rule again.

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

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

2-point-rule (only level 2):

The 2-point-rule 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. Then determine whether a 1 bit object (on/off) or an 8 bit object (on with percentage/off) should be used.

Hysteresis (in 0.1°C)	0…100; 20
Actuating variable is a	• 1-bit object • 8-bit object
Value (in %) *only for 8 bit objects*	0...100

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

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

5.5.3. Cooling control level 1/2

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

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

On the 2nd level (therefore only in case of a 2 level cooling), cooling is controlled via a PI or a 2-point-control.
On level 2, the set point deviation between the two levels must furthermore be determined, i. e. the highest set point value from which the 2nd level is then added (when values exceed this set point).

Set point difference between levels 1 and 2 (in 0.1°C) *only for level 2*	0…100; 40
Control type *only for level 2 and if no common variables are used*	• 2-point control • PI control

PI control with control parameters:

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

Control type	• **PI control**
Set control using	• **Controller parameter** • provided applications

Determine the deviation from the set point value which reaches maximum variable value, i. e. the point at which maximum cooling power is activated.
The reset time shows how quickly the controls react to deviations from the set point value. In case of a short reset time, the controls react with a fast increase of the variable. In case of a long reset time, the controls react somewhat more gently and needs longer until the necessary variable for the set point deviation is reached.
You should set the time appropriate to the cooling system at this point (note manufacturer instructions).

Maximum control variable is reached at set point/actual difference of (in °C)	0...5
Reset time (in min.)	1…255; 30

Now determine what should be transmitted when the control is blocked.
Upon release, the control variable follows the rule again.

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

In case of a common 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**
Set control using	• Controller parameter • **provided applications**
Application	• Cooling ceiling
Maximum control variable is reached at set point/actual difference of (in °C)	Cooling ceiling: 5
Reset time (in min.)	Cooling ceiling: 30

Now determine what should be transmitted when the control is blocked.
Upon release, the control variable follows the rule again.

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

2-point-rule (only level 2):

The 2-point-rule 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. Then determine whether a 1 bit object (on/off) or an 8 bit object (on with percentage/off) should be used.

Hysteresis (in 0.1°C)	0…100; 20
Actuating variable is a	• 1-bit object • 8-bit object
Value (in %) *only for 8 bit objects*	0...100

Now determine what should be transmitted when the control is blocked.
Upon release, the control variable follows the rule again.

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

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

5.6. Humidity PI control

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

Use Humidity control	**Yes** • No

General control

Sensor KNX AQS/TH-B-UP can be used to control one- or two-stage dehumidification or combined humidification/dehumidification.

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

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

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

Determine when the current control settings are to be sent to the bus. Periodic transmission is safer if a message does not reach a recipient. You may also set up periodic monitoring using an actuator with this setting.

Actuating variable comparator	• on change • on change and periodically
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 target value

The target values can be set directly in the application program using parameters, or be defined via the bus using a communications object.

Target value setting using parameter:

Set the target value directly.

Target value setpoint using	**Parameter** • Communications object
Target value in %	0 ... 100; 70

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

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

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

Setting a target value via communications object:

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

During initial commissioning, a target value must be provided which will be valid until the 1st communication of a new target value. For units which have already been taken into service, the last communicated target value can be used. Basically, an air humidity range is given in which the target value can be changed (object value limit).

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

Threshold value setpoint using	Parameter • **Communications object**
The last communicated value should be retained	• never • after restoration of power • after restoration of power and Programming
Start target value in % valid till 1st communication *(not upon saving the target value after programming)*	0 ... 100; 50
Object value limit (min) in 0.1°C	0...100; 40
Object value limit (max) in 0.1°C	0...100; 60
Type of threshold change	Absolute value • Increase/decrease
Step size *(upon increase/decrease change)*	1.00% • 2.00% • 5.00% • 10.00%

Dehumidification and/or humidification

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

For two-stage dehumidification, the target value difference between the two stages must be defined, i.e. at which target value undercut the 2nd stage is then switched to.

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

Determine the deviation from the target 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 contro responds to deviations from the target value. In case of a short reset time, the control responds with a fast increase of the variable. In case of a long reset time, the control responds somewhat less urgently and needs longer until the necessary variable for the target 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
Reset time in minutes	1...255; 30

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

When blocked, the variable shall	• not be sent • send a specific value
Value *(if a value is sent for one 1-bit object)*	0 • 1
Value (in %) (*(if a value is sent for an 8-bit object)*)	0...100

5.7. Dewpoint temperature

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

Use dewpoint temperature	No • **Yes**

Dewpoint temperature sent	• never • periodically • on change • on change and periodically
From change of *(is only sent if "on change" is selected)*	0.1°C • 0.2°C • 0.5°C • 1.0°C • 2.0°C • 5.0°C
Send cycle *(is only sent if "periodically" is selected)*	5 s • 10 s • 30 s • 1 min • ... • 2 h
Use monitoring of the coolant temperature	No • Yes

5.7.1. Coolant temperature monitoring

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

Minimum coolant temperature threshold value

Threshold value = dewpoint temperature + offset

The offset set last shall be maintained	• never • after restoration of power • after restoration of power and programming (do not use during initial setup)
Offset in °C *(only if the offset is not retained, or retained after restoration of power)*	0...20; 3
Step size for offset change using communication object	0.1°C • 0.2°C • 0.3°C • 0.4°C • 0.5°C • 1°C • 2°C • 3°C • 4°C • 5°C
Hysteresis of the threshold value in %	0 ... 50; 20
Threshold value sends	• never • periodically • on change • on change and periodically
From change of *(is only sent if "on change" is selected)*	0.1°C • 0.2°C • 0.5°C • 1.0°C • 2.0°C • 5.0°C
Send cycle *(is only sent if "periodically" is selected)*	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 (LV = Threshold value)	• LV above = 1 |LV - hysteresis below = 0 • LV above = 0 |LV - hysteresis below = 1 • LV below = 1 |LV + hysteresis above = 0 • LV below = 0 |LV + hysteresis above = 1
Delays can be set via objects (in seconds)	No • Yes
Switching delay from 0 to 1 *(when delay is not set using objects)*	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching delay from 1 to 0 *(when delay is not set using objects)*	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

Block

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 1st communication	0 • 1
Behaviour of the switching output	
With blocking	• Do not send message • send 0 • send 1
On release (with 2 seconds release delay)	[Dependent on the "Switching output sends" setting]

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

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

5.8. Absolute humidity

The absolute humidity value for the air is determined from the **KNX AQS/TH-B-UP** and can be output to the bus.

Use absolute humidity	No • Yes

Unit object 65: g/kg

Unit object 66: g/m³

Send behaviour	• never • periodically • on change • on change and periodically
From change of *(is only sent if "on change" is selected)*	0.1 g • 0.2 g • 0.5 g • 1.0 g • 2.0 g • 5.0 g
Send cycle *(is only sent if "periodically" is selected)*	5 s • 10 s • 30 s... • 2 h

5.9. Comfort field

The **Sensor KNX AQS/TH-B-UP** 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

Send behaviour	• never • periodically • on change • on change and periodically
Send cycle *(is only sent if "periodically" is selected)*	5 s • 10 s • 30 s... • 2 h
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

5.10. CO2 PI control

If you activate air quality control, you can use the following settings to define control type, target values, and ventilation.

Use control	**Yes** • No

General control

The **Sensor KNX AQS/TH-B-UP** can be used to control one or two-stage ventilation.

Type of control	• One-stage ventilation • Two-stage ventilation

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

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

Determine when the current control settings are to be sent to the bus. Periodic transmission is safer if a message does not reach a recipient. You may also set up periodic monitoring using an actuator with this setting.

Actuating variable comparator	• on change • on change and periodically
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 target value

The target values can be set directly in the application program using parameters, or be defined via the bus using a communications object.

Target value setting using parameter:

Set the target value directly.

Target value setpoint using	**Parameter** • Communications object
Target value in ppm	400…5000; 800

Setting a target value via communications object:

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

During initial commissioning, a target value must be provided which will be valid until the 1st communication of a new target value. For units which have already been taken into service, the last communicated target value can be used. Basically, an air humidity range is given in which the target value can be changed (object value limit).

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

Threshold value setpoint using	Parameter • **Communications object**
The last communicated value should be retained	• never • after restoration of power • after restoration of power and Programming
Start target value in ppm valid till 1st communication *(not upon saving the target value after programming)*	400… 5000; 800
Object value limit (min) in 0.1°C	400…5000; 400
Object value limit (max) in 0.1°C	400…5000; 1500
Type of threshold change	Absolute value • Increase/decrease
Step size in ppm *(upon increase/decrease change)*	1 • 2 • 5 • ... • 20 • ... • 100 • 200

Ventilation control

Depending on the control mode, one and/or two setting sections for the ventilation stages are displayed.

For two-stage ventilation, the target value difference between the two stages must be defined, i.e. the target value which, when exceeded, triggers the switch to the 2nd stage.

Target value difference between levels 1 and 2 Stage in ppm *(for stage 2 only)*	100...4000; 400

Determine the deviation from the target 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 contro responds to deviations from the target value. In case of a short reset time, the control responds with a fast increase of the variable. In case of a long reset time, the control responds somewhat less urgently and needs longer until the necessary variable for the target value deviation is reached.
You should set the time appropriate to the ventilation system at this point (follow the manufacturer's instructions).

Maximum control variable is reached at target value/actual difference of (in ppm)	100...4000; 100
Reset time in minutes	1...255; 10

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

When blocked, the variable shall	• not be sent • send a specific value
Value *(if a value is sent for one 1-bit object)*	0 • 1
Value (in %) *((if a value is sent for an 8-bit object))*	0...100

5.11. Variable comparator

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

Use comparator 1/2	No • Yes

5.11.1. 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
Send cycle *(is only sent if "periodically" is selected)*	5 s • 10 s • 30 s • ... • 5 min • ... • 2 h
From change of *(is only sent if "on change" is selected)*	1% • 2% • 5% • 10% • 20% • 25%
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
on release, output is sent (with 2 seconds release delay)	• the current value • the current value after receipt of an object

5.12. Logic

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

Use logic inputs	No • **Yes**
Object value prior to 1. communication for:	
Logic input 1... 16	0 • 1

AND logic

Logic 1/2/3/4/5/6/7/8	not active • active

OR logic

Logic 1/2/3/4/5/6/7/8	not active • active

5.12.1. AND and/or OR logic 1/2/3/4/5/6/7/8

AND- and OR logic gates provide the same setting options. Assign the inputs to a switching event and set the send behaviour.

1. / 2. / 3. / 4. Input	• do not use • all switching events which are available to the sensor (siehe *AND logic connection inputs*, Seite 48)“)
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

If the logic output sends two 8-bit objects:

Logic output sends	**two 8 bit objects**
Type of objects	• Value (0 ... 255) • Percent (0% ... 100%) • Angle (0°... 360°) • Scenario load (0 ... 127)
if logic = 1 ➔ object A value	Setting dependent on "type of object"
if logic = 0 ➔ object A value	Setting dependent on "type of object"
if logic = 1 ➔ object B value	Setting dependent on "type of object"
if logic = 0 ➔ object B value	Setting dependent on "type of object"

Send behaviour	• 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 + receipt of object • on change of logic + receipt of object and periodically
Send cycle *(is only sent if "periodically" is selected)*	5 s • 10 s • 30 s • 1 min • ... • 2 h

Block

Logic outputs can also be blocked using objects.

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 for logic = 0 • send value for logic = 1

Behaviour on release of the switching output is dependent on send behaviour

Value of the parameter "Send behaviour":	Settings options "Behaviour of the switching output on release":
on change of logic	• do not send message • send value for current logic status
on change of logic to 1	• do not send message • if logic = 1 ➔ send value for 1
on change of logic to 0	• do not send message • if logic = 0 ➔ send value for 0
on change of logic and periodically	send value for current logic status (no selection)
on change of logic to 1 and periodically	if logic = 1 ➔ send value for 1 (no selection)
on change of logic to 0 and periodically	if logic = 0 ➔ send value for 0 (no selection)
on change of logic and receipt of object	• do not send message • Status object/s send/s
on change of logic and receipt of object and periodically	send value for current logic status (no selection)

5.12.2. AND logic connection inputs

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
CO2 sensor malfunction = ON
CO2 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
Switching output temperature 4
Switching output temperature 4 inverted
Temp. control status changeover switching object

Temp. control status changeover switching object inverted
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
Temp. control status night reduction
Temp. control status night reduction inverted
Temp. control status window
Temp. control status window 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 cooling medium temperature
Switching output cooling medium temperature inv.
Switching output room climate status
Switching output room climate status inverted
Switching output CO2 1
Switching output CO2 1 inverted
Switching output CO2 2
Switching output CO2 2 inverted
Switching output CO2 3
Switching output CO2 3 inverted
Switching output CO2 4
Switching output CO2 4 inverted
CO2 controller status ventilation 1
CO2 controller status ventilation 1 inverted
CO2 controller status ventilation 2
CO2 controller status ventilation 2 inverted

5.12.3. 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
AND logic output 5
AND logic output 5 inverted
AND logic output 6
AND logic output 6 inverted
AND logic output 7
AND logic output 7 inverted
AND logic output 8
AND logic output 8 inverted

5.13. Display settings

Values and text can be displayed over two or three lines in the display. These can be internal readings or external data received from the bus. The input objects must be activated in order to be able to select external data.

Two-line display: Line 1 upper case, Line 2 upper case
Three-line display: Line 1 lower case, Line 2 upper case, Line 3 lower case

You can switch from either display to the thermostat display by pressing any pushbutton. Alternatively, the target value and/or temperature control can be permanently displayed.

🕮 *Display and operation at the device*, page 10

Use object "display contrast"	No • Yes
Display mode	• two lines (with optional thermostat display) • three lines (with optional thermostat display) • Permanent thermostat

For **manual temperature control**, the parameter "Use thermostat display upon key press" must be set to "Yes". In addition, you will need to set the pushbuttons which will be used for temperature control.

The following further parameters will then appear:

Temperature controller display when using pushbutton *(only possible if the pushbuttons are also set to "For temperature control")*	No • Yes
Type of temperature target value display *(only for active thermostat display)*	• Current target value • Basic setpoint • Basic setpoint as bar chart • Basic setpoint as bar chart with count • Basic setpoint as bar chart with range • Basic setpoint as bar chart with range and count (see also *Display and operation at the device*, page 10)

When switching from the two- or three line value display to the thermostat display, the display duration can also be set and return approved/blocked by means of an object.

Display duration in seconds for Temperature controller display *(only for thermostat display after pressing a pushbutton)*	2...240; 5
Use object "Return approval" *(only for thermostat display after pressing a pushbutton)*	No • Yes
Object evaluation *(only if Return approval object is used)*	• 1= Allow return | 0=Return not allowed • 1= Allow return | 0=Return not allowed
Object value prior to initial communication *(only if object Return approval is used)*	1 • 0

If **Values** (two or three lines) are displayed, the contents of the lines must be defined and where required, the input objects activated for external values.

Use input objects	No • Yes
Selection for content	• Do not display • Inside temperature • Outside temperature • Total temperature • Current thermostat target value • Dewpoint temperature • Inside relative humidity • Outside relative humidity • Total relative humidity • Absolute humidity g/kg • Absolute humidity g/m^3 • Inside CO2 reading • Outside CO2 reading • Total CO2 reading • Datum *(lower case only)* • Time • Value of 8 bit object 1/2/3 • Value of 16-bit object 1/2 *(lower case only)* • Text message 1/2 *(lower case only)*

5.14. Pushbutton

The integrated pushbuttons can be used as bus buttons (button interface) or for setting the temperature basic target values.

When used for temperature control, the increment per button press can be set in the temperature PI control.

Pressing the pushbuttons at the same time switches the unit from Eco-mode temporarily into comfort mode. The delay time for manual comfort mode is also set in the temperature PI control.

🕮 *Display and operation at the device*, page 10
🕮 Temperature PI control, *General variables*, page 32

Use pushbutton	• as button interface • for temperature control

If certain modes should not be selected using pushbuttons, these can be blocked for manual selection here. By default, "Building protection" mode cannot be selected ("No").

The following modes can be selected by pushbutton: Comfort/Standby/Eco/Building protection	No • Yes Yes/Yes/Yes/No

When used as a pushbutton interface, two further menus with settings options will appear.

5.14.1. Pushbutton interface 1/2

Activate the pushbutton interfaces as desired. Pushbutton interface 1 is linked to the left-hand pushbutton, interface 2 to the right-hand button.

Use pushbutton interface	No • Yes

Select pushbutton function:

Function	• Switch • Changeover switch • Shutter • Roller blind • Awning • Window • Dimmer • 8-bit encoder • 16-bit encoder • Scenario recall

Switch:

If the pushbutton is to be used as a switch, select the function "Switch" and define which values are sent when the button is pressed/released, and when these are sent.

Function	**Switch**
Command when pressing the pushbutton	• send 0 • send 1 • Do not send message
Command when releasing the pushbutton	• send 0 • send 1 • Do not send message
Send value	• 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
Value send all *(is only sent if "periodically" is selected)*	5 s ... 2 h

Changeover switching:

If the pushbutton is to be used for changeover switching, select the function "Changeover switching" and define which values are sent when the button is pressed/released, and when these are sent.

Function	**Changeover switching**
Command when pressing the pushbutton	• Changeover switching • Do not send message
Command when releasing the pushbutton	• Changeover switching • Do not send message

Shutter, blind, awning or window control:

if you want to actuate a drive using a pushbutton, select the "shutter", "awning", "blind", or "window" function and define the pushbutton function and control mode.

Function	**Shutter/blind/awning/window**	
Pushbutton function	Up • Down Up • Down • Up/Down On • Off • On/Off Open • Close • Open/ Close	(Shutter) (Blind) (Awning) (Window)
Control mode*	• Standard • Standard inverted • Comfort mode • Dead man's switch	

* For further details about settings, please see 📖 *Control modes for drive control*, page 55

Dimmer:

If the pushbutton should be used as a dimmer, select the function "Dimmer" and define the pushbutton function, time interval (switching/dimming) and if required, the repeat interval for extended pressing of the pushbutton.

Bus function	**Dimmer**
Pushbutton function	Brighter • darker • Brighter/darker
Time between switching and dimming in 0.1 seconds	1...50; 5
Repetition of the dimming command	no • yes
Repetition of the dimming command upon extended button actuation *(only if dimmer command is repeated)*	every 0.1 s... • every 2 s; every 1 s
Dimming by *(only if dimmer command is repeated)*	1.50% • 3% • 6% • 12,50% • 25% • 50%

8 bit encoder:

If a fixed 8-bit value should be sent using the pushbutton, select the "8-bit encoder" function and define the value to be sent

Bus function	**8 bit encoder**
Value	0...255

16 bit encoder:

If a fixed 16-bit value should be sent using the pushbutton, select the "16-bit encoder" function and define the value to be sent

Bus function	**16 bit encoder**
Value in 0.1	-6707600...6707600; 0

Scenario control:

If a scenario should be loaded using the pushbutton, select the "Scenario load" function and define a scenario number.

Bus function	**Scenario recall**
Scenario no.	0...127

5.14.2. Control modes for drive control

Standard:

If briefly operated, the drive will move incrementally or stops. If operated longer, the drive will move up to the end position. The time difference between "short" and "long" is set individually.

Control mode	**Standard**
Behavior during button operation: short = stop/increment long = Up or Down	
Time between short and long in 0.1 seconds	1...50; 10

Standard inverted:

When pushed shortly, the drive moves up to the end position. When pushed for longer, the drive moves incrementally or stops. The time difference between "short" and "long" and the repeat interval is set individually.

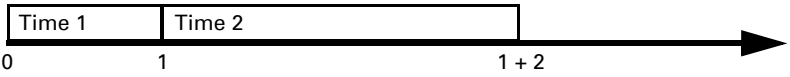
Control mode	**Standard inverted**
Behavior during button operation: short = Up or Down long = Stop/Step	
Time between short and long in 0.1 seconds	1...50; 10
Repeat the step command for a long button press	every 0.1 s • every 2 sec; every 0.5 sec

Comfort mode:

In the **comfort mode** pushing the button briefly, a bit longer and long will trigger different responses of the drive. The time intervals are set individually.

By pushing the button (shorter than adjustable time 1) the drive will be positioned (resp. stopped) incrementally.
If the drive is to be moved a bit farther, then a little longer push is needed (longer than time 1 but shorter than time 1+2). The drive stops immediately when releasing the button.
If the drive must be moved independently into the end position, the button is released only after times 1 + 2 have expired. The move can be stopped by briefly pushing.

Fig. 10
Time interval comfort mode diagram



Point in time 0:	*Push of button, start of time 1*
Release before time 1 expired:	*step (or stop if drive is moving)*
Point in time 1:	*End of time 1, start of time 2* *Moving command*
Release after time 1 expired *but before time 2 expires:*	*Stop*
Release after time 1 + 2 expired:	*Move into end position*

Control mode	**Comfort mode**
Behavior during button operation: Button is pushed and released before time 1 expired = stop/step held longer than time 1 = Up or Down released between time 1 and 1-2= stop released after time 1 +2 = no more stop	
Time 1	0.0s ... • 2 s; 0.4 s
Time 2	0 s • 2 s; 2 s

Dead man's switch:

The drive moves as soon as the button is pushed and stops as soon as the button is released.

Control mode	**Dead man's switch**
Behavior during button operation: Push button = Up or Down command Release button = Stop command	

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