Cala KNX

Indoor climate sensors with touch display

Item numbers

Cala KNX T:	70605 (signal white RAL 9003), 70610 (jet black RAL 9005)
Cala KNX TH:	70611 (signal white RAL 9003), 70612 (jet black RAL 9005)
Cala KNX AQS/TH:	70613 (signal white RAL 9003), 70614 (jet black RAL 9005)

Illustration with frame (not included in the deliverables)

elsner elektronik

Installation and Adjustment

1. Description 5
1.0.1. Deliverables 7
1.1. Technical specifications 7
1.1.1. Measuring accuracy 8
2. Installation and commissioning 8
2.1. Installation notes 8
2.2. Installation location 9
2.3. Device design 9
2.4. Sensor assembly 10
2.5. Notes on mounting and commissioning 11
3. Addressing the equipment 11
4. Maintenance and care 11
5. Operating the device via the touch display 12
5.1. Menu overview 12
5.2. Device settings 14
5.2.1. Display settings 14
5.2.2. Button tone 18
5.2.3. Version 19
5.3. Sensor system (measured value display) 19
5.4. Temperature control 21
5.5. Light 22
5.6. Drive (shading, window) 25
5.7. Scenes 26
5.8. Universal display 27
5.9. RGB control 28
5.10.Color temperature 29
5.11.HCL control 30
6. Transfer protocol 34
6.1. List of all communications objects 34
7. Setting the parameters and functions for all models 54
7.1. Behaviour on power failure/ restoration of power 54
7.2. General settings 54
7.3. Display 54
7.4. Button tone 56
7.5. Menus 57
7.5.1. Settings 57
7.5.2. Sensor system 57
7.5.3. Temperature control 58
7.5.4. Light 1-3 59
7.5.5. Drive 1-3 59
7.5.6. Scenes 60
7.5.7. Universal display 61
7.5.8. RGB control 62
7.5.9. Color temperature 62

7.5.10. HCL control ... 62
7.6. Variable comparator ... 64
7.6.1. Control variable comparator 1/2/3/4 ... 64
7.7. Computer ... 65
7.7.1. Computers 1-8 ... 65
7.8. Logic ... 69
7.8.1. AND logic 1-8 and OR logic outputs 1-8 ... 69
7.8.2. Connection inputs of the AND logic ... 71
7.8.3. Connection inputs of the OR logic ... 74
7.9. Button interfaces ... 74
7.9.1. Interface 1-4 ... 74
7.9.2. Control modes for drive control ... 77

8. Temperature parameter settings ... 80
8.1. Temperature Measurement ... 80
8.2. Temperature threshold values ... 80
8.2.1. Threshold value 1, 2, 3, 4 ... 80
8.3. Temperature PI control ... 83
8.3.1. Heating control level 1/2 ... 88
8.3.2. Cooling control level 1/2 ... 90
8.3.3. Fan Coil Control ... 92
8.4. Summer Compensation ... 93

9. Humidity parameter settings ... 95
9.1. Humidity Measurement ... 95
9.2. Humidity threshold values ... 95
9.2.1. Threshold value 1, 2, 3, 4 ... 96
9.3. Humidity PI control ... 98
9.4. Dewpoint measurement ... 101
9.4.1. Cooling medium temp. monitoring ... 101
9.5. Absolute humidity ... 103
9.6. Comfort field ... 104

10. CO_2 parameter settings ... 105
10.1. CO2 Measurement ... 105
10.2. CO2 threshold values ... 105
10.2.1. Threshold value 1, 2, 3, 4 ... 106
10.3. CO2 PI-control ... 108

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.

This document describes the functions for ALL device models.
Please check the information at the beginning of the chapter and in the text which describes the functions available for the respective individual models.

1. Description

The **Sensor with display Cala KNX** for the KNX bus system measures various ambient climate. Via the bus, the indoor sensor can receive external values and process them further with its own data to a total value (mixed value, e.g. room average).

All measured values can be used for the control of threshold value-dependent switching outputs. States can be linked via AND logic gates and OR logic gates. Multi-functional modules change input data as required by means of calculations, querying a condition, or converting the data point type. In addition, an integrated manipulated variable comparator can compare and output variables that were received via communication objects.

Integrated PI-controllers control ventilation (according to humidity or CO_2-concentration) and/or heating/cooling (according to temperature), depending on the respective model.

Cala KNX features a touch display that shows various display and control pages depending on the individual configuration. There is one page available that shows the current measured values, a menu area to adjust device settings and pages with touch control elements for internal temperature control, for light (manual switching or dimming), for shades or windows (manual operation).

Cala KNX is supplemented with a frame of the switch series used in buildings, and thus fits seamlessly into the interior fittings.

Common features in all models:

- **Colour touch display** with display and operating pages for
  - 1× display of current measured values
  - 1× display of bus data (4 universal spaces)
  - 1× temperature control (incl. mode change)
  - 3× drive operation (shading, window) with buttons, slider, position display
  - 3× switching or dimming of light (with percentage display)
  - 1× RGB light control
  - 1× light color temperature setting
  - 1× HCL control (adaption of light color temperature over adjustable periods of time)
  - 1× scenes (4 scenes with recall and storage)
  - device settings
- **Screen saver** (clock, off) and key tone may be switched on or off
- **4 inputs** for binary contacts or T-NTC temperature sensor.
- **8 AND and 8 OR logic gates** each with 4 inputs. All switching events as well as 16 logic inputs (in the form of communications objects) can be used as

inputs for the logic gates. The output from each gate can be configured optionally as 1-bit or 2 x 8-bit
- **8 multi-function modules** (computers) for changing the input data by calculations, by querying a condition or by converting the data point type
- **4 manipulated variable comparators** to output minimum, maximum or average values. 5 inputs each for values received via communication objects
- **Summer compensation** for cooling systems. A characteristic curve matches the target temperature in the room to the external temperature and sets the minimum and maximum target temperature values

Cala KNX AQS/TH functions (no. 70613, 70614):

- Measuring the **CO_2-concentration** of the air, the **temperature** and **air humidity** (relative, absolute), each with **mixed value calculation**. The share of internal measurement value and external value can be set as a percentage
- Bus message, whether the values for temperature and air humidity are within the **comfort field** (DIN 1946). **Dew point** calculation
- **Threshold values** can be adjusted per parameter or via communication objects
- **PI-controller for heating** (one or two-level) and **cooling** (one or two-level) according to temperature. Regulation according to separate set points or basic set point temperature. Fan coil control
- **PI controller for ventilation** according to humidity and CO_2-concentration: Ventilate/Air (one-level) or Ventilate (one or two-levels)

Cala KNX TH functions (no. 70611, 70612):

- **Temperature** and **air humidity** measurement (relative, absolute), in each case with **mixed value calculation**. The share of internal measurement value and external value can be set as a percentage
- Bus message, whether the values for temperature and air humidity are within the **comfort field** (DIN 1946). **Dew point** calculation
- **Threshold values** can be adjusted per parameter or via communication objects
- **PI-controller for heating** (one or two-level) and **cooling** (one or two-level) according to temperature. Regulation according to separate setpoints or basic set point temperature. Fan coil control
- **PI controller for ventilation** according to humidity: Ventilate/Air (one-level) or Ventilate (one or two-level)

Cala KNX T functions (no. 70605, 70610):

- Measuring the **Temperature** with a **mixed value calculation**. The share of internal measurement value and external value can be set as a percentage
- **Threshold values** can be adjusted per parameter or via communication objects
- **PI-controller for heating** (one or two-level) and **cooling** (one or two-level) according to temperature. Regulation according to separate set points or basic set point temperature. Fan coil control

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. Deliverables

- Housing with display
- Base plate
- Analogue/digital supply line

Additionally required (not included in the deliverables):

- Junction box Ø 60 mm, 42 mm deep
- Frame (for insert 55 x 55 mm), compatible to the switch scheme used in the building

1.1. Technical specifications

Material	Real glass, plastic
Display	Visible diagonal: 2.3 inch (59 mm) Resolution: 320 × 240 pixel
Colours	• black glass, black housing (jet black RAL 9005) • white glass, white housing (signal white RAL 9003)
Assembly	Flush mounting (Wall mounting in junction box Ø 60 mm, 42 mm deep)
Protection category	IP 20
Dimensions	approx. 55 × 55 × 35 (W × H × D, mm), mounting depth approx. 7 mm
Total weight	approx. 90 gr (incl. supply line, base plate
Ambient temperature	Operation -20…+70°C, storage -30…+70°C
Ambient humidity	max. 95% RH, avoid condensation
Operating voltage	KNX bus voltage
Bus current	max. 18 mA
Data output	KNX +/- bus connector terminal
BCU type	Integrated microcontroller
PEI type	0
Group addresses	max. 2000
Assignments	max. 2000
Communication objects	Cala KNX AQS/TH: 433 Cala KNX TH: 395 Cala KNX T: 341
Inputs	4× analogue/ digital, max. cable length 10 m.
measuring range T-NTC temperature sensor on Cala input	-40°C...+80°C
CO_2-sensor (for Cala KNX AQS/TH):	
CO_2-measuring range	300...5000 ppm

CO_2 resolution	1 ppm
CO_2 accuracy	± 50 ppm ± 3% of the measured value
Temperature sensor (for Cala KNX AQS/TH, Cala KNX TH, Cala KNX T):	
Temperature measuring range	-20…+70°C
Temperature resolution	0.1°C
Temperature accuracy*	± 0.8°C at -25…-10°C ± 0.5°C at -10…+65°C ± 0.6°C at +65…+70°C
Humidity sensor (for Cala KNX AQS/TH, Cala KNX TH):	
Humidity measuring range	0% HR … 100% HR
Humidity resolution	0.1%
Humidity accuracy	±7,5% HR at 0...10% HR ±4,5% HR at 10...90% HR ±7,5% HR at 90...100% HR
Humidity drift	± 0.5% RH per year in normal atmosphere

* Please note the information in chapter *Measuring accuracy*.

The product is compliant with the provisions of EC guidelines.

1.1.1. Measuring accuracy

Measurement deviations due to sources of interference (see chapter *Installation location*) must be corrected in the ETS in order to ensure the specified accuracy of the sensor (offset).

For a correct **CO_2 measurement** it is necessary to install the device in a windproof socket.

During **temperature measurement**, the self-heating of the device is taken into consideration by the electronics. It is compensated for by the software, therefore the displayed/output inside temperature measuring value is correct.

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 location

The sensor is installed in a flush-mounted box (Ø 60 mm, 42 mm deep).

The sensor may only be installed and used in dry interior spaces. 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
- Draughts from windows and doors
- Draughts from ducts which lead to the junction box in which the sensor is mounted from other rooms.
- Warming or cooling of the building structure on which the sensor is mounted, e.g. due to sunlight, heating or cold water pipes
- Connection lines, which lead from warmer or colder areas to the sensor

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

2.3. Device design

View with frame and base plate.

Fig. 1a

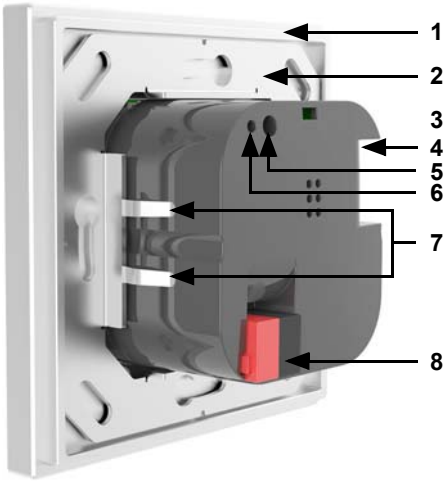


Fig. 1b

1 *Frame (not included in the deliverables)*
2 *Base plate*
3 *Openings for air circulation*
4 *Slot supply line inputs*
5 *Programming button (recessed) for teaching the device*
6 *Programming LED (recessed)*
7 *Catches*
8 *KNX terminal BUS +/-*

Fig. 2
Analogue/digital supply line inputs:
Input 1: white / black (GND)
Input 2: yellow / black (GND)
Input 3: purple / black (GND)
Input 4: blue / black (GND)

2.4. Sensor assembly

First, place the wind-proof box with the supply connection. Seal the inlet tubes as well, in order to prevent drafts.

Then screw the base plate onto the socket and position the frame of the switch range on top of this. Connect the bus lines +/- to the black-red KNX plug and plug the KNX plug into the intended slot (no. 8). If required, connect the analogue/digital inputs via the breakout cable that is included in the delivery.

Insert the housing firmly onto the metal frame using the catches so that sensor and frame are fixed together.

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.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 the equipment

The equipment is delivered with the bus address 15.15.255. You can program a different address in the ETS by overwriting the address 15.15.255 or by teaching the device via the programming button.

The programming button can be reached through the opening on the rear of the housing; it is recessed. Use a thin object to reach the button, e.g. a 1.5 mm^2 wire.

4. Maintenance and care

Fingerprints on the display and the housing are best removed with a cloth moistened with water or a microfibre cloth. Do not use an abrasive cleaning agent or aggressive cleansing agents.

5. Operating the device via the touch display

The available display and operating options on the device depend on the ETS "menu" settings. Here you decide which menus are shown.

You call up the different menus on the display by swiping to the right or left. You navigate to sub-menus via the touch keys and the navigation bar at the bottom of the screen using the symbols Back (= cancel), start page, OK (= confirm).

Other display settings can be adjusted in the ETS in the "Display" and "Button tone" sections. However, you may also use the "Settings" menu on the display itself if it is released for display.

5.1. Menu overview

••••• Navigation by swiping, top menu level.

Cancel key. Go up one menu level without saving.

Start page key. To start page without saving.

OK **Confirm** key. Save and go up one menu level.

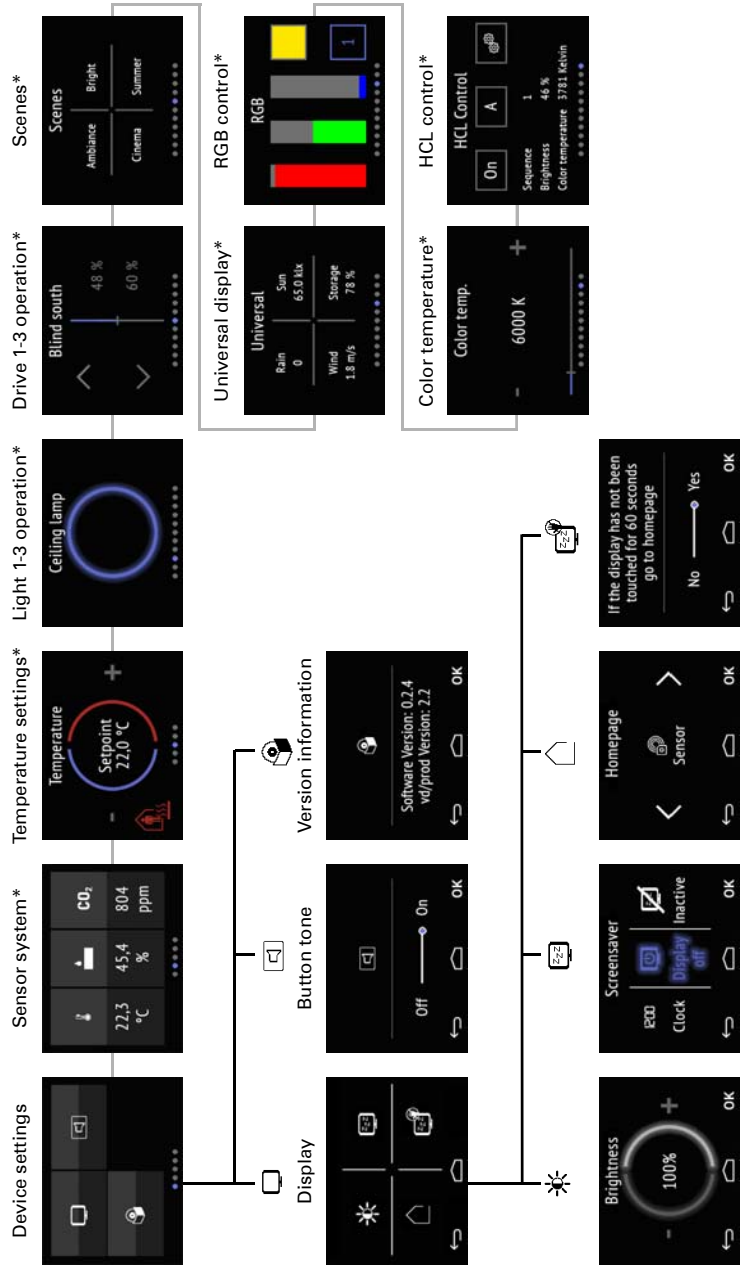


Fig. 3

* Display depends on the device model or the settings selected.

5.2. Device settings

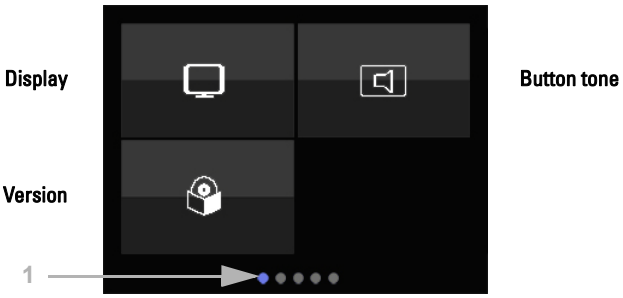
The adaptation of display settings on the device is only possible if the "Settings" have been activated in the ETS setting item "Menus".

📖 *Menus*, page 57

You can modify screen settings on the

- "Settings" display pages
- switch the button tone on or off
- show the device and application version

Fig. 4: "Settings" menu



(1) The dots on the lower display edge symbolise the individual menu pages in the main menus. The currently selected position is marked in colour. Swipe to the left or right on the display to show the other menu pages.

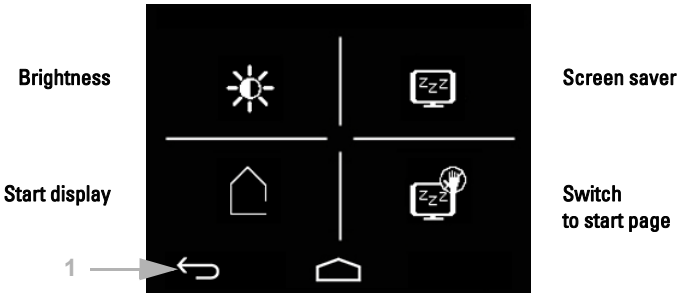
5.2.1. Display settings

Tap on the screen symbol to call up the screen settings.

Here you can adjust

- the display brightness
- select the type of screen saver
- determine the start page
- decide if you want the display to switch to the start page if it has not been touched for a certain period of time.

Fig. 5: Menu Settings > Display



(1) The touch keys on the navigation bar in the overview and in all sub-menus allow you to

cancel and return to the previous menu level without saving

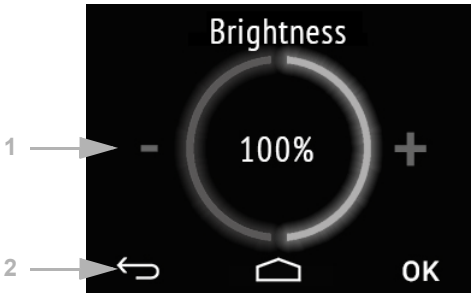
jump to the start page without saving

OK and also to confirm and return to the previous menu level after saving from the settings screens

Display brightness

Tap on the brightness symbol to call up the display brightness settings.

Fig. 6: Menu Settings > Display > Brightness



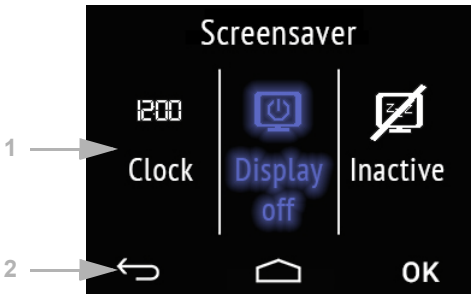
(1) Tap on the left part of the screen (-) to reduce screen brightness. Tap on the right part (+) to increase brightness. Settings range 1...100%.

(2) The navigation bar keys take you back to the start page or let you confirm the changes with **OK**.

Screen saver

Tap the screen saver symbol to select the type of screen saver or switch the screen saver off.

Fig. 7: Menu Settings > Display > Screen saver



(1) Select the desired screen saver function. The selected function is shown in blue.

Screen saver "clock" becomes active after the period set in the ETS.

Screen is switched off after the period set in the ETS.

Screen saver not active

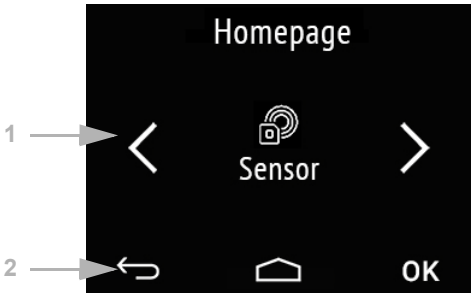
(2) The navigation bar keys take you back to the start page or let you confirm the changes with **OK**.

Start display

Tap the start page symbol to modify the start page.

The start page is the menu that is shown after startup and pressing the house symbol. One may also set the display screen to jump back to the start screen by itself if the screen has not been touched for a certain period of time (see next setting).

Fig. 8: Menu Settings > Display > Screen saver



(1) Switch to the desired start page menu with the left/right arrow keys. The name of the menu and if applicable the symbol are displayed.

Settings

Sensor system (measured value display)

Light 1-3

Drive 1-3

Scenes

Universal display

RGB control

Color temperature

HCL control

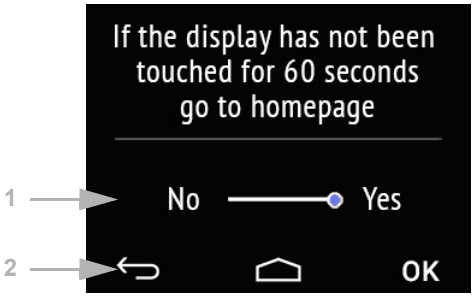
Only those menus are shown that have been activated for display in the ETS (see chapter *Menus*, page 57).

(2) The navigation bar keys take you back to the start page or allow you to confirm the changes with **OK**.

Switch to start page

Tap on the symbol "Switch to start page" in order to switch automatic return to the start page on or off.

Fig. 9: Menu Settings > Display > Screen saver



(1) Activate or deactivate the function by tapping on the words **No** or **Yes** or drag the slide bar to the desired setting. The wait time for the switch is pre-set in the ETS (see chapter *Display*, page 54).

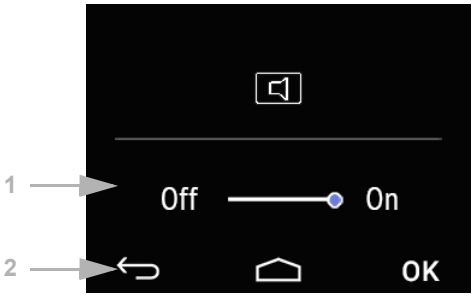
(2) The navigation bar keys take you back to the start page or allow you to confirm the changes with **OK**.

5.2.2. Button tone

Tap on the loudspeaker symbol to call up the button tone settings.

The button tone may be emitted as an acoustic acknowledgement when a touch key is activated.

Fig. 10: Menu Settings > Button tone



(1) Activate or deactivate the function by tapping on the words **Off** or **On** or drag the slide bar to the desired setting.

(2) The navigation bar touch keys allow you to

cancel and return to the previous menu level without saving

jump to the start page without saving

OK confirm and return to the previous menu level after saving from the settings screens

5.2.3. Version

Tap on the software symbol to show the device version.

Fig. 11: Menu Settings > Version

(1) This shows the software version and the application version (VD or KNXprod file) that is needed for the device.

(2) The navigation bar touch keys allow you to

cancel and return to the previous menu level without saving

jump to the start page without saving

OK confirm and return to the previous menu level after saving from the settings screens

5.3. Sensor system (measured value display)

The display of measured values on the device is only possible if the "Sensor system" has been activated in the ETS setting item "Menus".

Menus, page 57.

Fig. 12: Menu Sensor system, example Cala KNX AWS/TH

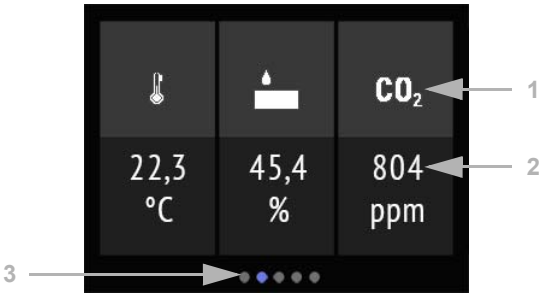
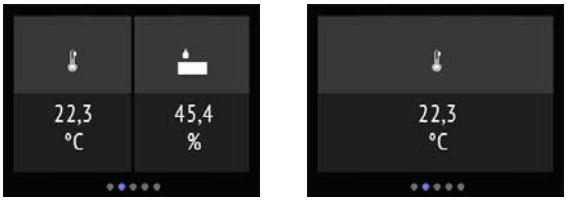


Fig. 13 a+b: Sensor system menu: Cala KNX TH, Cala KNX T



On the display page "Sensor system, the current measuring values from the sensor **(2)** are displayed underneath the **(1)** symbols for the measuring variables. Depending on the model, this can be temperature, air humidity and/or the carbon dioxide level of the air.

The temperature is displayed in degree Celsius.

The relative air humidity is displayed in %.

CO_2 The CO_2 content in the air is shown in ppm (parts per million), with 1000 ppm = 0,1%.

CO_2 levels between 300 ppm and 1000 ppm are referred to as fresh air. From 1000 ppm to 2000 ppm the air is considered stale.

In all cases, this is the measuring value from the device.

(3) The dots on the lower display edge symbolise the individual menu pages in the main menus. The currently selected position is marked in colour. Swipe to the left or right on the display to show the other menu pages.

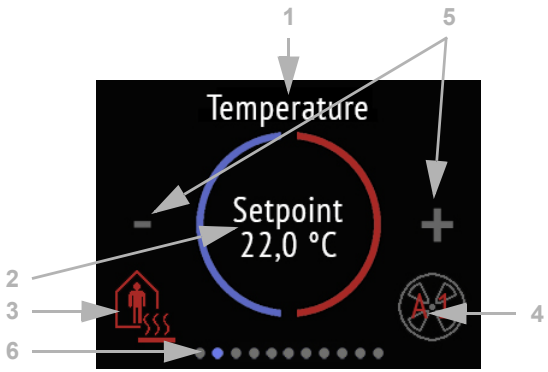
5.4. Temperature control

The room temperature can be set individually on the "Temperature controller" operating page.

The manual temperature setting on the device is only possible if "Temperature control" has been activated in the ETS setting item "Menus".

Menus, page 57 and *Temperature control*, page 58.

Fig. 14: Temperature control menu:



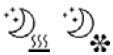
(1) name
(2) current nominal value
(3) current mode (option)
(4) fan level information / fan coil (option)

(3) Tapping on the mode symbol displays the temperature control modes that have been approved for display selection in the ETS. The current mode is shown in red. In order to select a different mode, first switch to the symbol of the desired mode by tapping. Then remain on the symbol a little longer. If the button tone is active, you will receive an acoustic feedback. The mode is now active, and the colour for this symbol changed from white to red.

The modes change in the following sequence:


Comfort (day, present), heating and/or cooling


Standby (day, brief absence), heating and/or cooling


Eco (night), heating and/or cooling active


Building protection (prolonged absence, e.g. vacation), heating and/or cooling active

The small additional symbol shows whether heating or cooling is active at the current room temperature (use depends on the connected system).

As long as Eco mode is active, there is an additional symbol for "comfort extension". This option may also be blocked in the ETS (symbol does not appear for selection).

Remain on the comfort extension symbol for a little longer in order to briefly switch back to comfort operation. This allows the user to maintain the nominal comfort value for a longer time, e.g. when having guests. The duration of this comfort extension period is set in the ETS. The remaining time is shown next to the symbol. After the comfort extension period is terminated, the system returns to Eco mode.

(4) The current mode and level in red are displayed in the fan coil icon. "A" means "automatic", "M" manual ".

By tapping on the fan icon, the level can be changed manually. By repeatedly touching, the display changes to M0 (manual Off), M1 (manual level 1), M2 (manual level 2), M3 (manual level 3) and back to AX (automatic).

To confirm the selection and activate the displayed mode, stay on the icon for a little longer. When the button tone is activated, an acoustic feedback occurs. The mode is now active, the color of the symbol has changed from white to red.

(5) The nominal value for the current mode can be adjusted by tapping on the minus and/or plus symbol.

If the manual modification of the nominal value is blocked in one mode, the symbol "Manual blocked" is briefly shown when an attempt is made to modify the value.

(6) The dots on the lower display edge symbolise the individual menu pages in the main menus. The currently selected position is marked in colour. Swipe to the left or right on the display to show the other menu pages.

5.5. Light

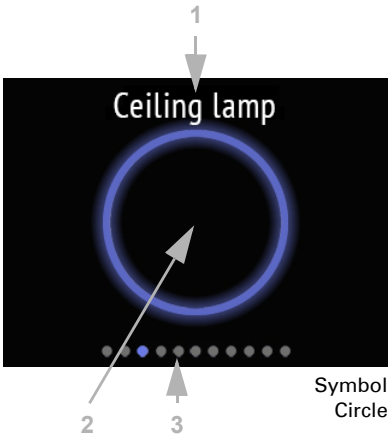
Lights can be switched or dimmed on the maximum of three operating pages "Light".

The manual temperature setting on the device is only possible if "Light" has been activated in the ETS setting item "Menus". The maximum number of light pages is three.
🕮 *Menus*, page 57 and *Light 1-3*, page 59

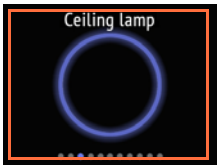
Depending on the type of lamp and the settings made in the ETS, the display page "Light" shows various elements.

Switching over an On/Off area

Fig. 15: Light menu, an area



Light bulb symbol



Touch area (marked in red)

Light switch (tap or touch for longer to dim)

If **Switching via an area On/Off** has been selected, the display shows:
(1) name
(2) area with the selected symbol

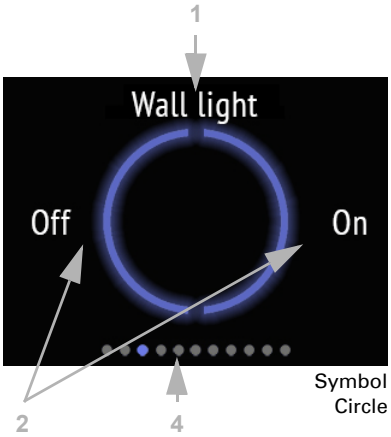
The symbol is grey when switched off, and blue when on.

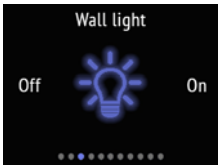
The area switches between on and off. If dimming is set in addition, touch the area for longer to dim. This process is shown by repeated dimming of the symbol. When dimming, any new contact also switches, i.e. the dimming increases in brightness or decreases alternately.

(3) The dots on the lower display edge symbolise the individual menu pages in the main menus. The currently selected position is marked in colour. Swipe to the left or right in this area to show the other menu pages.

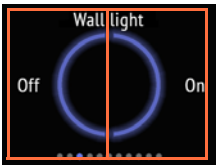
Switching via two areas On - Off

Fig. 16: Light menu, two areas (switching)





Light bulb symbol



Touch areas (marked in red)

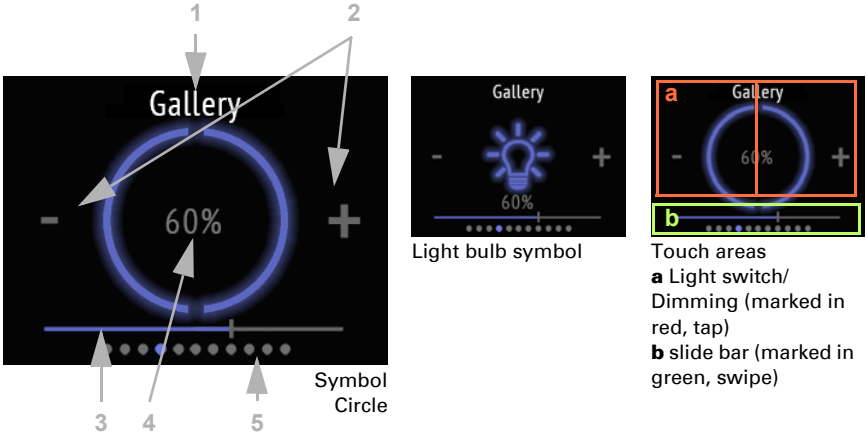
Light switch (tap)

If **Switching via two areas On - Off** has been selected, the display shows:
(1) name
(2) two areas with the selected symbol

The symbol is grey when switched off, and blue when on.

Tap on the left part of the screen to switch off the light. Tap on the right part to switch on.

Fig. 17: Light menu, two areas (dimming)



(2) If additional dimming is possible, a minus and a plus symbol are shown. Touching the left part of the screen (-) dims down. Touching the right part (+) dims up.

(3) Alternatively, swipe left (darker) or right (brighter) on the slider bar that is shown in the *lower* part of the display. The slide bar position shows the current brightness of the lamp in percent.

(4) The current brightness value in percent is displayed if this has been activated in the ETS.

(5) The dots on the lower display edge symbolise the individual menu pages in the main menus. The currently selected position is marked in colour. Swipe to the left or right in the *top* half of the display to show the other menu pages.

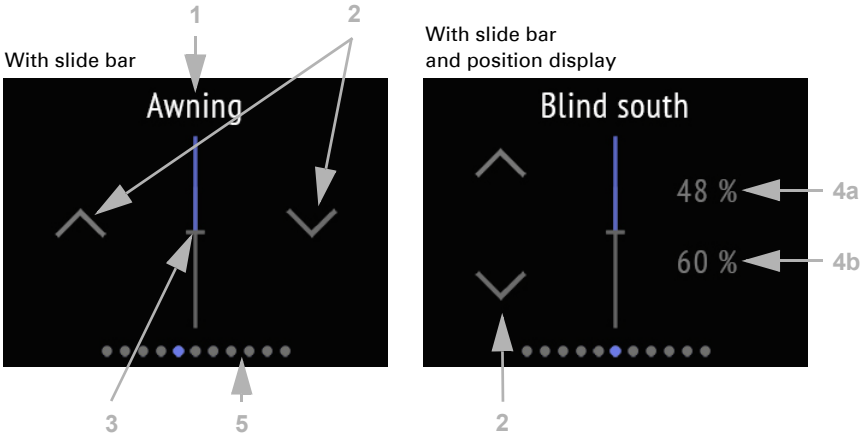
5.6. Drive (shading, window)

Blinds, shutters, awnings can be moved up and down, or windows can be opened and closed on the maximum of three "Drive" operating pages.

Manual operation setting of shading or windows on the device is only possible if "Drive" has been activated in the ETS setting item "Menus". The maximum number of drive pages is three.

🕮 *Menus*, page 57 and *Drive 1-3*, page 59

Fig. 18: Drive menu



(1) name
(2) keys for up and down.
(3) slide bar (option)
(4) current drive position (option)
The key reaction (standard, inverted, comfort, dead man) can be set in the ETS.
🕮 *Drive 1-3*, page 59

(3) The slide bar allows you to quickly adjust the movement position. This change does *not* influence the slat position of slat shutters. The slide bar position shows the current movement position in percent. Depending on the ETS settings, it can start with 0% from top or bottom.

(4) In addition, the (a) drive position and, in the case of blinds, also the (b) slat position can be displayed as percentage values.

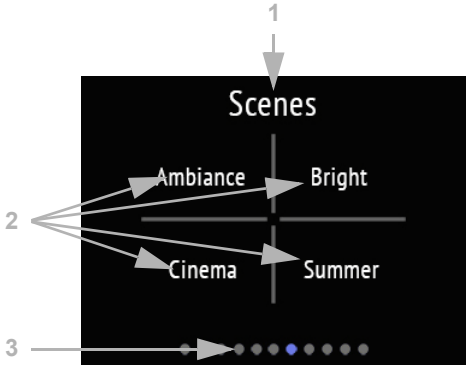
(5) The dots on the lower display edge symbolise the individual menu pages in the main menus. The currently selected position is marked in colour. Swipe to the left or right on the display to show the other menu pages.

5.7. Scenes

Up to four individual scenarios can be called up or saved on the "Scenes" operating page.

Scene control on the device is only possible if the individual "Scenes" have been activated in the ETS setting item "Menus".
🕮 *Menus*, page 57 and *Scenes*, page 60

Fig. 19: Menu Scenes



The "Scenes" display page is divided into four areas for calling and storing four scenes. The menu page shows the
(1) name entered in the ETS.
(2) Each scene area is also named individually.
The basic setup of the scenes, such as the assignment of the functions, takes place in the ETS
🕮 *Scenes*, page 60

A scene is called up by briefly tapping in the scene area. If storage has been activated in the ETS, the current settings of the assigned functions can be transferred to the scene memory by touching the area for a longer time. When called, the new settings will be executed from now on.

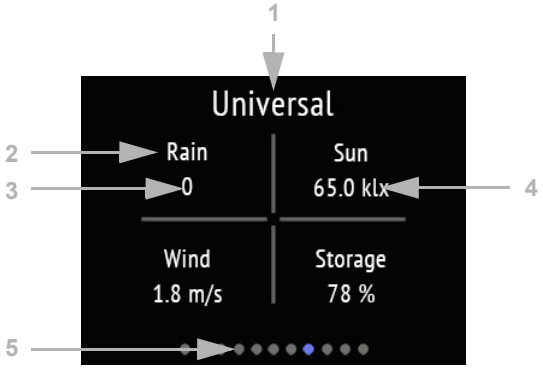
(3) The dots on the lower display edge symbolise the individual menu pages in the main menus. The currently selected position is marked in colour. Swipe to the left or right on the display to show the other menu pages.

5.8. Universal display

On the "Unversal display" display page, values can be displayed in up to four areas.

The page is only displayed if the "Universal display" has been activated in the ETS setting item "Menus".
🕮 *Menus*, page 57 and Universal display, page 61

Fig. 20: Menu Üniversal display



The "Unversal display" menu page is divided into four areas, each of which can be used to display values.

(1) name
(2) display area with individual labeling
(3) value
(4) unit

The universal menu serves as a pure display / information page, not for the operation of functions.
The basic setup of the universal menu is done in the ETS.
🕮 Universal display, page 61

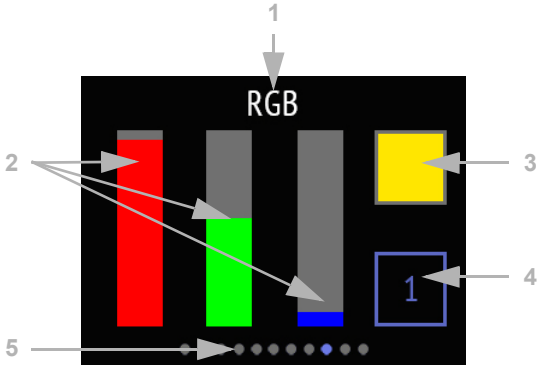
(5) The dots on the lower display edge symbolise the individual menu pages in the main menus. The currently selected position is marked in colour. Swipe to the left or right on the display to show the other menu pages.

5.9. RGB control

On the "RGB control" operating page, the color of an RGB light can be individually adjusted.

Manual setting of a RGB color value on the device is only possible if the "RGB control" has been activated in the ETS setting item "Menus".
🕮 *Menus*, page 57 and RGB control, page 62

Fig. 21: Menu RGB control



(1) name
(2) three color bars for red (R), green (G), and blue (B)
(3) color result box
(4) button for switching the light
Function details can be set in the ETS.
📖 RGB control, page 62

(2) Change the color by using the color bars for RGB like three sliders. Swiping up or down in each bar increases or decreases the amount of color.

(3) The result is displayed in the color box on the top right. To send the newly set color to the bus, tap the color box. Only then the change will get visible when the light is on. Please note that the color and intensity of the controlled luminaire can have a different appearance than on the display of **Cala KNX**.

(4) The key 1/0 at bottom right is a light switch. Tap the area to switch. When the light is off, the button is gray and shows a 0, when the light is on, it is blue and shows a 1.

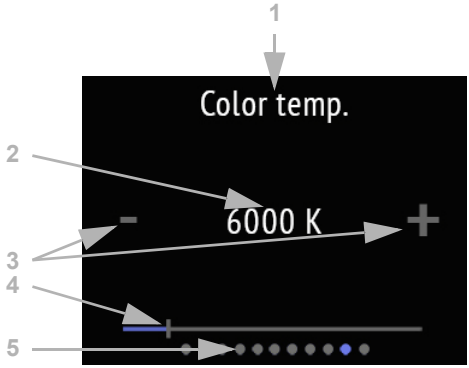
(5) The dots on the lower display edge symbolise the individual menu pages in the main menus. The currently selected position is marked in colour. Swipe to the left or right on the display to show the other menu pages.

5.10. Color temperature

On the "Color temperature" operating page, the light temperature of a luminaire can be individually adjusted.

Manual setting of a light color temperature on the device is only possible if the "Color temperature" has been activated in the ETS setting item "Menus".
📖 *Menus*, page 57 and Color temperature, page 62

Fig. 22: Menu Color temperature



(1) name
(2) current value
(3) buttons -/+
(4) slider to change the color temperature value
Function details can be set in the ETS.
Color temperature, page 62

(3) Change the color temperature by tapping +/-.

(4) Alternatively, drag the slider to the left (warmer) or to the right (colder) by swiping with your finger in the lower half of the display. The value is transferred directly to the bus and the change is visible when the light is on.

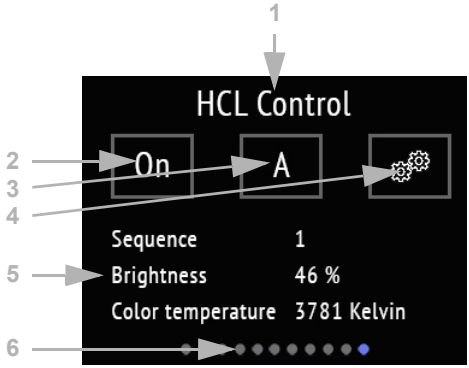
(5) The dots on the lower display edge symbolise the individual menu pages in the main menus. The currently selected position is marked in colour. Swipe to the left or right on the display to show the other menu pages.

5.11. HCL control

A lighting scenario can be set on the "HCL control" operating page. The aim of the HCL control is to mimic the natural change in sunlight throughout the day by gradually adjusting the light temperature and brightness of the artificial lighting. This is to support the daily rhythm of humans, which is why this type of light control is called "Human Centric Lighting" (HCL).

The setting of the light adaption to the daily routine (Human Centric Lighting, HLC) on the device is only possible if the "HCL control" has been activated in the ETS setting item "Menus".
Menus, page 57 and HCL control, page 62

Fig. 23: Menü HCL control



(1) name
(2) button for activating or deactivating the entire HCL control
(3) button for switching between manual and automatic
(4) button for the sequence setting menus
(5) currently running sequence and the current values
As long as no time is received via the bus, "No time available" is displayed. As long as the current time is not covered by a sequence, "Time not in sequence" is displayed.
Function details can be set in the ETS.
🕮 HCL control, page 62

In HCL control, the day can be divided into up to 8 sequences. For each sequence, that means each period, target values for color temperature and brightness in % are set. Between start value and end value (stop value), the controller calculates the course of the values linearly. It can be defined in the ETS as of which change the values are sent to the bus, thus how fine the gradations should be.

(2) The entire HCL control can be activated and deactivated with the On / Off button. The button displays the current status.

(3) The status Automatic (A) or Manual (M) is displayed and can also be changed by touching the button. Manual operation of the light via the bus or button will turn the HCL control inactive until reset or switch to "A" with this button.
The automatic reset can be set in the ETS and takes place either through an object or after the expiry of a time.

(4) Each sequence can be set and changed on the display of the **Cala KNX**. Touch the settings button to enter the sequence area.

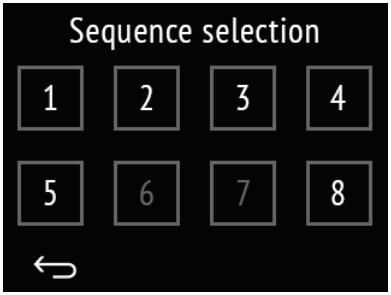


Fig. 24: Sequence selection

The numbers of all sequences released for use are displayed in white, locked sequences in gray. To release or lock a sequence, stay on the sequence button longer, until the color changes. When the keypad tone is activated, an acoustic feedback occurs.

A brief tap on the sequence button will take you to the configuration of the sequence.

Fig. 25: Sequence X setting

The start and stop times and the values of brightness and color temperature at the end of the sequence are displayed.

Touch the area with the times to change them.

Touch the area with the values to adjust them.

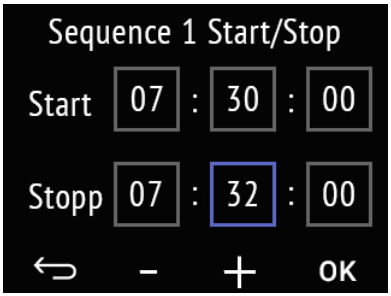


Fig. 26: Sequence X start/stop

Touch the individual areas for hour, minute, and second, the start and stop times to change them.

As long as a field is bordered in blue, the value can be changed with +/-.

With OK you confirm all values and leave the time setting.

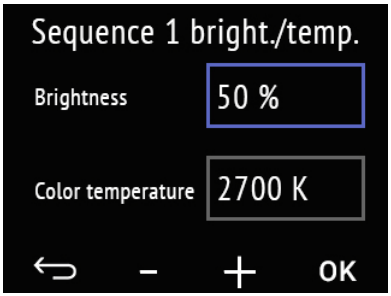


Fig. 27: Sequence X brightness/temperature

Touch the areas for brightness value and color temperature value to change them.

As long as a field is bordered in blue, the value can be changed with +/-.

With OK you confirm all values and leave the setting.


Cancel and return to the previous menu level without saving.

(6) The dots on the lower display edge symbolise the individual menu pages in the main menus. The currently selected position is marked in colour. Swipe to the left or right on the display to show the other menu pages.

6. 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 %

6.1. List of all communications objects

Abbreviation flags:

C Communication
R Read
W Write
T Transfer
U Update

No.	Text	Function	Flags	DPT type	Size
Display and user interfaces (objects 1-89) for all models					
1	Software version	Output	R-CT	[217,001] DPT_Version	2 bytes
21	Date / time	Input	-WCT	[19.001] DPT_-DateTime	8 bytes
22	Date	Input	-WCT	[11.1] DPT_Date	3 bytes
23	Time	Input	-WCT	[10.1] DPT_-TimeOfDay	3 bytes
25	Screen brightness in %	Input	RWC-	[5.1] DPT_Scaling	1 byte
26	Screen save (1=ON | 0=OFF)	Input	RWC-	[1.1] DPT_Switch	1 bit
27	Screen saver illumination (1=ON | 0=OFF)	Input	RWC-	[1.1] DPT_Switch	1 bit
28	Screen saver wait time in seconds	Input	RWC-	[7.005] DPT_-TimePeriodSec	2 bytes
29	Screen no touch wait time in seconds	Input	RWC-	[7.005] DPT_-TimePeriodSec	2 bytes
30	Display language	Input	RWC-	[234.001] DPT_LanguageC-odeAlpha2_ASCII	2 bytes
31	Button tone (1=ON | 0=OFF)	Input	RWC-	[1.1] DPT_Switch	1 bit
34	Switch Light 1 on/off	Input/ Output	RWCT	[1.1] DPT_Switch	1 bit
35	Dim Light 1	Output	R-CT	[3.7] DPT_Con-trol_Dimming	4 bit

No.	Text	Function	Flags	DPT type	Size
36	Light 1 brightness	Input/ Output	RWCT	[5.1] DPT_Scaling	1 byte
37	Switch Light 2 on/off	Input/ Output	RWCT	[1.1] DPT_Switch	1 bit
38	Dim Light 2	Output	R-CT	[3.7] DPT_Control_Dimming	4 bit
39	Light 2 brightness	Input/ Output	RWCT	[5.1] DPT_Scaling	1 byte
40	Switch Light 3 on/off	Input/ Output	RWCT	[1.1] DPT_Switch	1 bit
41	Dim Light 3	Output	R-CT	[3.7] DPT_Control_Dimming	4 bit
42	Light 3 brightness	Input/ Output	RWCT	[5.1] DPT_Scaling	1 byte
44	Drive 1 long-term	Output	--CT	[1.8] DPT_Up-Down	1 bit
45	Drive 1 short-term	Output	--CT	[1.8] DPT_Up-Down	1 bit
46	Drive 1 movement position	Input/ Output	RWCT	[5.1] DPT_Scaling	1 byte
47	Drive 1 slat position	Input	-WCT	[5.1] DPT_Scaling	1 byte
48	Drive 2 long-term	Output	--CT	[1.8] DPT_Up-Down	1 bit
49	Drive 2 short-term	Output	--CT	[1.8] DPT_Up-Down	1 bit
50	Drive 2 movement position	Input/ Output	RWCT	[5.1] DPT_Scaling	1 byte
51	Drive 2 slat position	Input	-WCT	[5.1] DPT_Scaling	1 byte
52	Drive 3 long-term	Output	--CT	[1.8] DPT_Up-Down	1 bit
53	Drive 3 short-term	Output	--CT	[1.8] DPT_Up-Down	1 bit
54	Drive 3 movement position	Input / Output	RWCT	[5.1] DPT_Scaling	1 byte
55	Drive 3 slat position	Input	-WCT	[5.1] DPT_Scaling	1 byte
61	Scene 1	Output	R-CT	[18.1] DPT_Scene-Control	1 byte
62	Scene 2	Output	R-CT	[18.1] DPT_Scene-Control	1 byte
63	Scene 3	Output	R-CT	[18.1] DPT_Scene-Control	1 byte
64	Scene 4	Output	R-CT	[18.1] DPT_Scene-Control	1 byte

No.	Text	Function	Flags	DPT type	Size
68	Universal menu Function1	Input	-WCT	Depending on setting	4 bytes
69	Universal menu Function 2	Input	-WCT	Depending on setting	4 bytes
70	Universal menu Function 3	Input	-WCT	Depending on setting	4 bytes
71	Universal menu Function 4	Input	-WCT	Depending on setting	4 bytes
73	Switch RGB control	Input / Output	RWCT	[1.1] DPT_Switch	1 bit
74	RGB control colour red, green and blue	Input / Output	RWCT	[232.600] DPT_-Colour_RGB	3 bytes
75	RGB control colour red	Input / Output	RWCT	[5.10] DPT_-Value_1_Ucount	1 byte
76	RGB control colour green	Input / Output	RWCT	[5.10] DPT_-Value_1_Ucount	1 byte
77	RGB control colour blue	Input / Output	RWCT	[5.10] DPT_-Value_1_Ucount	1 byte
78	Colour temperature	Input / Output	RWCT	[7.600] DPT_Absolute_Colour_Temperature	2 bytes
81	HCL control Brightness	Output	R-CT	[5.1] DPT_Scaling	1 byte
82	HCL control Color temperature	Output	R-CT	[7.600] DPT_Absolute_Colour_Temperature	2 bytes
83	HCL control start/stop	Input / Output	RWCT	[1.1] DPT_Switch	1 bit
84	HCL control Automatic/Manual status	Ausgang	R-CT	[1.1] DPT_Switch	1 bit
85	HCL control Reset of automatic	Input	-WC-	[1.1] DPT_Switch	1 bit
86	HCL control Switch to manual with switching	Input	-WC-	[1.1] DPT_Switch	1 bit
87	HCL control Switch to manual with brightness	Input	-WC-	[5.1] DPT_Scaling	1 byte
88	HCL control Switch to manual with color temperature	Input	-WC-	[7.600] DPT_Absolute_Colour_Temperature	2 bytes
89	HCL control Sequence 1 release	Input / Output	RWCT	[1.1] DPT_Switch	1 bit
90	HCL control Sequence 2 release	Input / Output	RWCT	[1.1] DPT_Switch	1 bit
91	HCL control Sequence 3 release	Input / Output	RWCT	[1.1] DPT_Switch	1 bit

No.	Text	Function	Flags	DPT type	Size
92	HCL control Sequence 4 release	Input / Output	RWCT	[1.1] DPT_Switch	1 bit
93	HCL control Sequence 5 release	Input / Output	RWCT	[1.1] DPT_Switch	1 bit
94	HCL control Sequence 6 release	Input / Output	RWCT	[1.1] DPT_Switch	1 bit
95	HCL control Sequence 7 release	Input / Output	RWCT	[1.1] DPT_Switch	1 bit
96	HCL control Sequence 8 release	Input / Output	RWCT	[1.1] DPT_Switch	1 bit
Temperature sensor (objects 101-137) for all models					
101	Temperature sensor: Malfunction	Output	R-CT	[1.1] DPT_Switch	1 bit
102	Temperature sensor: Measured value external	Input	-WCT	[9.1] DPT_Value_Temp	2 bytes
103	Temperature sensor: Measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
104	Temperature sensor: Measured value total	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
105	Temperature sensor: Measured value min./max. query	Input	-WC-	[1.017] DPT_Trigger	1 bit
106	Temperature sensor: Minimum measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
107	Temperature sensor: Maximum measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
108	Temperature sensor: measured value min./max. reset	Input	-WC-	[1.017] DPT_Trigger	1 bit
111	Temp. threshold value 1: Absolute value	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
112	Temp. threshold value 1: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
113	Temp. threshold value 1: Switching delay from 0 to 1	Input	-WC-	[7.005] DPT_TimePeriodSec	2 bytes
114	Temp. threshold value 1: Switching delay from 1 to 0	Input	-WC-	[7.005] DPT_TimePeriodSec	2 bytes
115	Temp. threshold value 1: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
116	Temp. threshold value 1: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
118	Temp. threshold value 2: Absolute value	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
119	Temp. threshold value 2: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
120	Temp. threshold value 2: Switching delay from 0 to 1	Input	-WC-	[7.005] DPT_TimePeriodSec	2 bytes

No.	Text	Function	Flags	DPT type	Size
121	Temp. threshold value 2: Switching delay from 1 to 0	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
122	Temp. threshold value 2: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
123	Temp. threshold value 2: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
125	Temp. threshold value 3: Absolute value	Input/ Output	RWCT	[9.1] DPT_Val-ue_Temp	2 bytes
126	Temp. threshold value 3: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
127	Temp. threshold value 3: Switching delay from 0 to 1	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
128	Temp. threshold value 3: Switching delay from 1 to 0	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
129	Temp. threshold value 3: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
130	Temp. threshold value 3: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
132	Temp. threshold value 4: Absolute value	Input/ Output	RWCT	[9.1] DPT_Val-ue_Temp	2 bytes
133	Temp. threshold value 4: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
134	Temp. threshold value 4: Switching delay from 0 to 1	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
135	Temp. threshold value 4: Switching delay from 1 to 0	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
136	Temp. threshold value 4: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
137	Temp. threshold value 4: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
Temperature control (objects 141-175) for all models					
141	Temp. controller: HVAC mode (priority 1)	Input	-WC-	[20.102] DPT_H-VACMode	1 byte
142	Temp. controller: HVAC mode (priority 2)	Input	RWCT	[20.102] DPT_H-VACMode	1 byte
143	Temp. controller: Mode frost/heat protection activation	Input	RWCT	[1.1] DPT_Switch	1 bit
144	Temp. controller: Block (1 = Blocking)	Input	-WC-	[1.1] DPT_Switch	1 bit
145	Temp. controller: Current setpoint	Output	R-CT	[9.1] DPT_Val-ue_Temp	2 bytes
146	Temp. controller: Switching (0: Heating | 1: Cooling)	Input	-WC-	[1.1] DPT_Switch	1 bit
147	Temp. controller: Nominal value comfort heating	Input/ Output	RWCT	[9.1] DPT_Val-ue_Temp	2 bytes

No.	Text	Function	Flags	DPT type	Size
148	Temp. controller: Nominal value comfort heating (1:+ | 0: -)	Input	-WC-	[1.1] DPT_Switch	1 bit
149	Temp. controller: Nominal value comfort cooling	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
150	Temp. controller: Nominal value comfort cooling (1:+ | 0: -)	Input	-WC-	[1.1] DPT_Switch	1 bit
151	Temp. controller: Basic 16-bit setpoint shift	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
152	Temp. controller: Nominal value standby heating	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
153	Temp. controller: Nominal value standby heating (1:+ | 0: -)	Input	-WC-	[1.1] DPT_Switch	1 bit
154	Temp. controller: Nominal value standby cooling	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
155	Temp. controller: Nominal value standby cooling (1:+ | 0: -)	Input	-WC-	[1.1] DPT_Switch	1 bit
156	Temp. controller: Nominal value eco heating	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
157	Temp. controller: Nominal value eco heating (1:+ | 0: -)	Input	-WC-	[1.1] DPT_Switch	1 bit
158	Temp. controller: Nominal value eco cooling	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
159	Temp. controller: Nominal value eco cooling (1:+ | 0: -)	Input	-WC-	[1.1] DPT_Switch	1 bit
160	Temp. controller: Act. variable, heating (level 1)	Output	R-CT	[5.1] DPT_Scaling	1 byte
161	Temp. controller: Act. variable, heating (level 2)	Output	R-CT	[5.1] DPT_Scaling	1 byte
162	Temp. controller: Act. variable cooling (level 1)	Output	R-CT	[5.1] DPT_Scaling	1 byte
163	Temp. controller: Act. variable cooling (level 2)	Output	R-CT	[5.1] DPT_Scaling	1 byte
164	Temperature controller Act. variable for 4/6-way valve	Output	R-CT	[5.1] DPT_Scaling	1 byte
165	Temp. controller: Status heating level 1 (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
166	Temp. controller: Status heating level 2 (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
167	Temp. controller: Status cooling level 1 (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
168	Temp. controller: Status cooling level 2 (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
169	Temp. controller: Comfort extension status	Input/ Output	RWCT	[1.1] DPT_Switch	1 bit

No.	Text	Function	Flags	DPT type	Size
170	Temp. controller: Comfort extension time	Input	RWCT	[7.005] DPT_-TimePeriodSec	2 bytes
171	Temp. Controller: Fan coil level 0 to 3	Output	R-CT	[5.1] DPT_Scaling	1 byte
172	Temp. Controller: Fan coil level 1	Output	R-CT	[1.1] DPT_Switch	1 bit
173	Temp. Controller: Fan coil level 2	Output	R-CT	[1.1] DPT_Switch	1 bit
174	Temp. Controller: Fan coil level 3	Output	R-CT	[1.1] DPT_Switch	1 bit
175	Temp. Controller: Fan coil auto=1 manual=0	Input / Output	RWCT	[1.1] DPT_Switch	1 bit
Summer compensation (objects 191-193) for all models					
191	Summer compensation: Outdoor temperature	Input	-SKÜ	[9.1] DPT_Value_Temp	2 bytes
192	Summer compensation: Target value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
193	Summer compensation: Block (1 = Blocking)	Input	-WC-	[1.1] DPT_Switch	1 bit
Humidity sensor (objects 211-244) for Cala KNX AQS/TH (item no. 70613, 70614), Cala KNX TH (item no. 70611, 70612),					
211	Humidity sensor: Malfunction	Output	R-CT	[1.1] DPT_Switch	1 bit
214	Humidity sensor: External measured value	Input	-WCT	[9,007] DPT_Value_Humidity	2 bytes
215	Humidity sensor: Measured value	Output	R-CT	[9,007] DPT_Value_Humidity	2 bytes
216	Humidity sensor: Measured value total	Output	R-CT	[9,007] DPT_Value_Humidity	2 bytes
217	Humidity sensor: Measured value min./max. query	Input	-WC-	[1.017] DPT_Trigger	1 bit
218	Humidity sensor: Minimum measured value	Output	R-CT	[9,007] DPT_Value_Humidity	2 bytes
219	Humidity sensor: Maximum measured value	Output	R-CT	[9,007] DPT_Value_Humidity	2 bytes
220	Humidity sensor: measured value min./max. reset	Input	-WC-	[1.017] DPT_Trigger	1 bit
221	Humidity threshold value 1: Absolute value	Input/ Output	RWCT	[9,007] DPT_Value_Humidity	2 bytes
222	Humidity threshold value 1: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
223	Humidity threshold value 1: Delay from 0 to 1	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
224	Humidity threshold value 1: Delay from 1 to 0	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
225	Humidity threshold value 1: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit

No.	Text	Function	Flags	DPT type	Size
226	Humidity threshold value 1: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
227	Humidity threshold value 2: Absolute value	Input/ Output	RWCT	[9,007] DPT_Value_Humidity	2 bytes
228	Humidity threshold value 2: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
229	Humidity threshold value 2: Delay from 0 to 1	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
230	Humidity threshold value 2: Delay from 1 to 0	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
231	Humidity threshold value 2: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
232	Humidity threshold value 2: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
233	Humidity threshold value 3: Absolute value	Input/ Output	RWCT	[9,007] DPT_Value_Humidity	2 bytes
234	Humidity threshold value 3: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
235	Humidity threshold value 3: Delay from 0 to 1	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
236	Humidity threshold value 3: Delay from 1 to 0	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
237	Humidity threshold value 3: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
238	Humidity threshold value 3: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
239	Humidity threshold value 4: Absolute value	Input/ Output	RWCT	[9,007] DPT_Value_Humidity	2 bytes
240	Humidity threshold value 4: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
241	Humidity threshold value 4: Delay from 0 to 1	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
242	Humidity threshold value 4: Delay from 1 to 0	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
243	Humidity threshold value 4: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
244	Humidity threshold value 4: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
Dew point, coolant monitoring (objects 261-269) for Cala KNX AQS/TH (item no. 70613, 70614), Cala KNX TH (item no. 70611, 70612)					
261	Dewpoint: Measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
262	Coolant temp.: Threshold value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
263	Coolant temp.: Actual value	Input	RWCT	[9.1] DPT_Value_Temp	2 bytes

No.	Text	Function	Flags	DPT type	Size
264	Coolant temp.: Offset change (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
265	Coolant temp.: Offset current	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
266	Coolant temp.: Switching delay from 0 to 1	Input	-WC-	[7.005] DPT_TimePeriodSec	2 bytes
267	Coolant temp.: Switching delay from 1 to 0	Input	-WC-	[7.005] DPT_TimePeriodSec	2 bytes
268	Coolant temp.: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
269	Coolant temp.: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
Absolute humidity (objects 271-272) for Cala KNX AQS/TH (item no. 70613, 70614), Cala KNX TH (item no. 70611, 70612)					
271	Absolute humidity [g/kg]	Output	R-CT	[14.5] DPT_Value_Amplitude	4 bytes
272	Absolute humidity [g/m³]	Output	R-CT	[14.17] DPT_Value_Density	4 bytes
Room climate status (objects 274-275) for Cala KNX AQS/TH (item no. 70613, 70614), Cala KNX TH (item no. 70611, 70612)					
274	Ambient climate status: 1 = comfortable | 0 = uncomfortable	Output	R-CT	[1.1] DPT_Switch	1 bit
275	Ambient climate status: Text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
Humidity control (objects 291-299) for Cala KNX AQS/TH (item no. 70613, 70614), Cala KNX TH (item no. 70611, 70612)					
291	Humidity controller: Block (1: block)	Input	-WC-	[1.2] DPT_Bool	1 bit
292	Humidity controller: Target value	Input/ Output	RWCT	[9,007] DPT_Value_Humidity	2 bytes
293	Humidity controller: Target value (1:+ | 0:-)	Input	-WC-	[1.2] DPT_Bool	1 bit
294	Humidity controller: Act. variable dehumidification	Output	R-CT	[5.1] DPT_Scaling	1 byte
295	Humidity controller: Act. variable de-humidifying level 2	Output	R-CT	[5.1] DPT_Scaling	1 byte
296	Humidity controller: Act. variable humidification	Output	R-CT	[5.1] DPT_Scaling	1 byte
297	Humidity controller: Dehumidification status (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
298	Humidity controller: Dehumidification 2 status (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
299	Humidity controller: Humidification status (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit

No.	Text	Function	Flags	DPT type	Size
CO2 sensor (objects 231-361) for Cala KNX AQS/TH (item no. 70613, 70614)					
331	CO2 sensor: Malfunction	Output	R-CT	[1.1] DPT_Switch	1 bit
332	CO2 sensor: External measured value	Input	-WCT	[9,008] DPT_Value_AirQuality	2 bytes
333	CO2 sensor: Measured value	Output	R-CT	[9,008] DPT_Value_AirQuality	2 bytes
334	CO2 sensor: Measured value total	Output	R-CT	[9,008] DPT_Value_AirQuality	2 bytes
335	CO2 sensor: Measured value max. query	Input	-WC-	[1.017] DPT_Trigger	1 bit
336	CO2 sensor: Maximum measured value	Output	R-CT	[9,008] DPT_Value_AirQuality	2 bytes
337	CO2 sensor: Measured value max. reset	Input	-WC-	[1.017] DPT_Trigger	1 bit
338	CO2 threshold value 1: Absolute value	Input/ Output	RWCT	[9,008] DPT_Value_AirQuality	2 bytes
339	CO2 threshold value 1: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
340	CO2 threshold value 1: Delay from 0 to 1	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
341	CO2 threshold value 1: Delay from 1 to 0	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
342	CO2 threshold value 1: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
343	CO2 threshold value 1: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
344	CO2 threshold value 2: Absolute value	Input/ Output	RWCT	[9,008] DPT_Value_AirQuality	2 bytes
345	CO2 threshold value 2: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
346	CO2 threshold value 2: Delay from 0 to 1	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
347	CO2 threshold value 2: Delay from 1 to 0	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
348	CO2 threshold value 2: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
349	CO2 threshold value 2: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
350	CO2 threshold value 3: Absolute value	Input/ Output	RWCT	[9,008] DPT_Value_AirQuality	2 bytes
351	CO2 threshold value 3: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
352	CO2 threshold value 3: Delay from 0 to 1	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
353	CO2 threshold value 3: Delay from 1 to 0	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes

No.	Text	Function	Flags	DPT type	Size
354	CO2 threshold value 3: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
355	CO2 threshold value 3: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
356	CO2 threshold value 4: Absolute value	Input/ Output	RWCT	[9,008] DPT_Value_AirQuality	2 bytes
357	CO2 threshold value 4: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
358	CO2 threshold value 4: Delay from 0 to 1	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
359	CO2 threshold value 4: Delay from 1 to 0	Input	-WC-	[7.005] DPT_-TimePeriodSec	2 bytes
360	CO2 threshold value 4: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
361	CO2 threshold value 4: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
CO2 controller (objects 362-368) for Cala KNX AQS/TH (item no. 70613, 70614)					
362	CO2 controller: Block (1: block)	Input	-WC-	[1.2] DPT_Bool	1 bit
363	CO2 controller: Target value	Input/ Output	RWCT	[9,008] DPT_Value_AirQuality	2 bytes
364	CO2 controller: Target value (1:+ | 0:-)	Input	-WC-	[1.2] DPT_Bool	1 bit
365	CO2 controller: Act. variable ventilation	Output	R-CT	[5.1] DPT_Scaling	1 byte
366	CO2 controller: Act. variable ventilation level 2	Output	R-CT	[5.1] DPT_Scaling	1 byte
367	CO2 controller: Ventilation status (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
368	CO2 controller: Status ventilation level 2 (1=ON | 0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
Act. variable comparator (objects 401-428) for all models					
401	Comparator 1 actuating variable: Input 1	Input	-WC-	[5.1] DPT_Scaling	1 byte
402	Comparator 1 actuating variable: Input 2	Input	-WC-	[5.1] DPT_Scaling	1 byte
403	Comparator 1 actuating variable: Input 3	Input	-WC-	[5.1] DPT_Scaling	1 byte
404	Comparator 1 actuating variable: Input 4	Input	-WC-	[5.1] DPT_Scaling	1 byte
405	Comparator 1 actuating variable: Input 5	Input	-WC-	[5.1] DPT_Scaling	1 byte
406	Comparator 1 actuating variable: Output	Output	R-CT	[5.1] DPT_Scaling	1 byte

No.	Text	Function	Flags	DPT type	Size
407	Comparator 1 actuating variable: Block (1: block)	Output	-WC-	[1.2] DPT_Bool	1 bit
408	Comparator 2 actuating variable: Input 1	Input	-WC-	[5.1] DPT_Scaling	1 byte
409	Comparator 2 actuating variable: Input 2	Input	-WC-	[5.1] DPT_Scaling	1 byte
410	Comparator 2 actuating variable: Input 3	Input	-WC-	[5.1] DPT_Scaling	1 byte
411	Comparator 2 actuating variable: Input 4	Input	-WC-	[5.1] DPT_Scaling	1 byte
412	Comparator 2 actuating variable: Input 5	Input	-WC-	[5.1] DPT_Scaling	1 byte
413	Comparator 2 actuating variable: Output	Output	R-CT	[5.1] DPT_Scaling	1 byte
414	Comparator 2 actuating variable: Block (1: block)	Output	-WC-	[1.2] DPT_Bool	1 bit
415	Comparator 3 actuating variable: Input 1	Input	-WC-	[5.1] DPT_Scaling	1 byte
416	Comparator 3 actuating variable: Input 2	Input	-WC-	[5.1] DPT_Scaling	1 byte
417	Comparator 3 actuating variable: Input 3	Input	-WC-	[5.1] DPT_Scaling	1 byte
418	Comparator 3 actuating variable: Input 4	Input	-WC-	[5.1] DPT_Scaling	1 byte
419	Comparator 3 actuating variable: Input 5	Input	-WC-	[5.1] DPT_Scaling	1 byte
420	Comparator 3 actuating variable: Output	Output	R-CT	[5.1] DPT_Scaling	1 byte
421	Comparator 3 actuating variable: Block (1: block)	Output	-WC-	[1.2] DPT_Bool	1 bit
422	Comparator 4 actuating variable: Input 1	Input	-WC-	[5.1] DPT_Scaling	1 byte
423	Comparator 4 actuating variable: Input 2	Input	-WC-	[5.1] DPT_Scaling	1 byte
424	Comparator 4 actuating variable: Input 3	Input	-WC-	[5.1] DPT_Scaling	1 byte
425	Comparator 4 actuating variable: Input 4	Input	-WC-	[5.1] DPT_Scaling	1 byte
426	Comparator 4 actuating variable: Input 5	Input	-WC-	[5.1] DPT_Scaling	1 byte
427	Comparator 4 actuating variable: Output	Output	R-CT	[5.1] DPT_Scaling	1 byte
428	Comparator 4 actuating variable: Block (1: block)	Output	-WC-	[1.2] DPT_Bool	1 bit

No.	Text	Function	Flags	DPT type	Size
Computer (multi-function modules) (objects 441-504) for all models					
441	Computer 1: Input I1	Input	RWCT	Depending on setting	4 bytes
442	Computer 1: Input I2	Input	RWCT	Depending on setting	4 bytes
443	Computer 1: Input I3	Input	RWCT	Depending on setting	4 bytes
444	Computer 1: Output O1	Output	R-CT	Depending on setting	4 bytes
445	Computer 1: Output O2	Output	R-CT	Depending on setting	4 bytes
446	Computer 1: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
447	Computer 1: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
448	Computer 1: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit
449	Computer 2: Input I1	Input	RWCT	Depending on setting	4 bytes
450	Computer 2: Input I2	Input	RWCT	Depending on setting	4 bytes
451	Computer 2: Input I3	Input	RWCT	Depending on setting	4 bytes
452	Computer 2: Output O1	Output	R-CT	Depending on setting	4 bytes
453	Computer 2: Output O2	Output	R-CT	Depending on setting	4 bytes
454	Computer 2: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
455	Computer 2: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
416	Computer 2: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit
457	Computer 3: Input I1	Input	RWCT	Depending on setting	4 bytes
458	Computer 3: Input I2	Input	RWCT	Depending on setting	4 bytes
459	Computer 3: Input I3	Input	RWCT	Depending on setting	4 bytes
460	Computer 3: Output O1	Output	R-CT	Depending on setting	4 bytes
461	Computer 3: Output O2	Output	R-CT	Depending on setting	4 bytes
462	Computer 3: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
463	Computer 3: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
464	Computer 3: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit

No.	Text	Function	Flags	DPT type	Size
465	Computer 4: Input I1	Input	RWCT	Depending on setting	4 bytes
466	Computer 4: Input I2	Input	RWCT	Depending on setting	4 bytes
467	Computer 4: Input I3	Input	RWCT	Depending on setting	4 bytes
468	Computer 4: Output O1	Output	R-CT	Depending on setting	4 bytes
469	Computer 4: Output O2	Output	R-CT	Depending on setting	4 bytes
470	Computer 4: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
471	Computer 4: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
472	Computer 4: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit
473	Computer 5: Input I1	Input	RWCT	Depending on setting	4 bytes
474	Computer 5: Input I2	Input	RWCT	Depending on setting	4 bytes
475	Computer 5: Input I3	Input	RWCT	Depending on setting	4 bytes
476	Computer 5: Output O1	Output	R-CT	Depending on setting	4 bytes
477	Computer 5: Output O2	Output	R-CT	Depending on setting	4 bytes
478	Computer 5: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
479	Computer 5: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
480	Computer 5: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit
481	Computer 6: Input I1	Input	RWCT	Depending on setting	4 bytes
482	Computer 6: Input I2	Input	RWCT	Depending on setting	4 bytes
483	Computer 6: Input I3	Input	RWCT	Depending on setting	4 bytes
484	Computer 6: Output O1	Output	R-CT	Depending on setting	4 bytes
485	Computer 6: Output O2	Output	R-CT	Depending on setting	4 bytes
486	Computer 6: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
487	Computer 6: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
488	Computer 6: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit
489	Computer 7: Input I1	Input	RWCT	Depending on setting	4 bytes

No.	Text	Function	Flags	DPT type	Size
490	Computer 7: Input I2	Input	RWCT	Depending on setting	4 bytes
491	Computer 7: Input I3	Input	RWCT	Depending on setting	4 bytes
492	Computer 7: Output O1	Output	R-CT	Depending on setting	4 bytes
493	Computer 7: Output O2	Output	R-CT	Depending on setting	4 bytes
494	Computer 7: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
495	Computer 7: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
496	Computer 7: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit
497	Computer 8: Input I1	Input	RWCT	Depending on setting	4 bytes
498	Computer 8: Input I2	Input	RWCT	Depending on setting	4 bytes
499	Computer 8: Input I3	Input	RWCT	Depending on setting	4 bytes
500	Computer 8: Output O1	Output	R-CT	Depending on setting	4 bytes
501	Computer 8: Output O2	Output	R-CT	Depending on setting	4 bytes
502	Computer 8: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
503	Computer 8: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
504	Computer 8: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit
Logic (objects 521-604) for all models					
521	Logic input 1	Input	-WC-	[1.2] DPT_Bool	1 bit
522	Logic input 2	Input	-WC-	[1.2] DPT_Bool	1 bit
523	Logic input 3	Input	-WC-	[1.2] DPT_Bool	1 bit
524	Logic input 4	Input	-WC-	[1.2] DPT_Bool	1 bit
525	Logic input 5	Input	-WC-	[1.2] DPT_Bool	1 bit
526	Logic input 6	Input	-WC-	[1.2] DPT_Bool	1 bit
527	Logic input 7	Input	-WC-	[1.2] DPT_Bool	1 bit
528	Logic input 8	Input	-WC-	[1.2] DPT_Bool	1 bit
529	Logic input 9	Input	-WC-	[1.2] DPT_Bool	1 bit
530	Logic input 10	Input	-WC-	[1.2] DPT_Bool	1 bit
531	Logic input 11	Input	-WC-	[1.2] DPT_Bool	1 bit
532	Logic input 12	Input	-WC-	[1.2] DPT_Bool	1 bit
533	Logic input 13	Input	-WC-	[1.2] DPT_Bool	1 bit
534	Logic input 14	Input	-WC-	[1.2] DPT_Bool	1 bit

No.	Text	Function	Flags	DPT type	Size
535	Logic input 15	Input	-WC-	[1.2] DPT_Bool	1 bit
536	Logic input 16	Input	-WC-	[1.2] DPT_Bool	1 bit
541	AND logic 1: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
542	AND logic 1: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
543	AND logic 1: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
544	AND logic 1: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
545	AND logic 2: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
546	AND logic 2: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
547	AND logic 2: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
548	AND logic 2: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
549	AND logic 3: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
550	AND logic 3: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
551	AND logic 3: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
552	AND logic 3: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
553	AND logic 4: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
554	AND logic 4: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
555	AND logic 4: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
556	AND logic 4: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
557	AND logic 5: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
558	AND logic 5: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
559	AND logic 5: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
560	AND logic 5: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
561	AND logic 6: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
562	AND logic 6: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
563	AND logic 6: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
564	AND logic 6: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
565	AND logic 7: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
566	AND logic 7: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
567	AND logic 7: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte

No.	Text	Function	Flags	DPT type	Size
568	AND logic 7: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
569	AND logic 8: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
570	AND logic 8: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
571	AND logic 8: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
572	AND logic 8: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
573	OR logic 1: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
574	OR logic 1: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
575	OR logic 1: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
576	OR logic 1: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
577	OR logic 2: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
578	OR logic 2: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
579	OR logic 2: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
580	OR logic 2: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
581	OR logic 3: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
582	OR logic 3: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
583	OR logic 3: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
584	OR logic 3: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
585	OR logic 4: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
586	OR logic 4: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
587	OR logic 4: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount0	1 byte
588	OR logic 4: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
589	OR logic 5: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
590	OR logic 5: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
591	OR logic 5: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
592	OR logic 5: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
593	OR logic 6: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
594	OR logic 6: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
595	OR logic 6: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
596	OR logic 6: Block	Input	-WC-	[1.1] DPT_Switch	1 bit

No.	Text	Function	Flags	DPT type	Size
597	OR logic 7: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
598	OR logic 7: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
599	OR logic 7: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
600	OR logic 7: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
601	OR logic 8: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
602	OR logic 8: 8-bit output A	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
603	OR logic 8: 8-bit output B	Output	R-CT	[5.010] DPT_Value_1_Ucount	1 byte
604	OR logic 8: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
Inputs (objects 611-664) for all models					
621	Push-button 1 long-term	Output	R-CT	[1.8] DPT_UpDown	1 bit
622	Push-button 1 short-term	Output	R-CT	[1.10] DPT_Start	1 bit
623	Push-button 1 switching	Output	R-CT	[1.1] DPT_Switch	1 bit
624	Push button 1 dimming	Input/ Output	RWCT	[3.7] DPT_Control_Dimming	4 bit
625	Push-button 1 encoder 8 bit	Output	R-CT	[5.10] DPT_Value_1_Ucount	1 byte
626	Push-button 1 encoder 16 bit	Output	R-CT	[9] 9.xxx	2 bytes
627	Button 1 Scene (call up)	Output	R-CT	[18,001] DPT_SceneControl	1 byte
628	Button 1 NTC measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
629	Button 1 NTC external measured value	Input	-WC-	[9.1] DPT_Value_Temp	2 bytes
630	Button 1 NTC total measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
631	Button 1 NTC malfunction	Output	R-CT	[1.1] DPT_Switch	1 bit
632	Push-button 2 long-term	Output	R-CT	[1.8] DPT_UpDown	1 bit
633	Push-button 2 short-term	Output	R-CT	[1.10] DPT_Start	1 bit
634	Push-button 2 switching	Output	R-CT	[1.1] DPT_Switch	1 bit
635	Push button 2 dimming	Input/ Output	RWCT	[3.7] DPT_Control_Dimming	4 bit
636	Push-button 2 encoder 8 bit	Output	R-CT	[5.10] DPT_Value_1_Ucount	1 byte
637	Push-button 2 encoder 16 bit	Output	R-CT	[9] 9.xxx	2 bytes

No.	Text	Function	Flags	DPT type	Size
638	Button 2 Scene (call up)	Output	R-CT	[18,001] DPT_SceneControl	1 byte
639	Button 2 NTC measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
630	Button 2 NTC external measured value	Input	-WC-	[9.1] DPT_Value_Temp	2 bytes
641	Button 2 NTC total measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
642	Button 2 NTC malfunction	Output	R-CT	[1.1] DPT_Switch	1 bit
643	Push-button 3 long-term	Output	R-CT	[1.8] DPT_UpDown	1 bit
644	Push-button 3 short-term	Output	R-CT	[1.10] DPT_Start	1 bit
645	Push-button 3 switching	Output	R-CT	[1.1] DPT_Switch	1 bit
646	Push button 3 dimming	Input/ Output	RWCT	[3.7] DPT_Control_Dimming	4 bit
647	Push-button 3 encoder 8 bit	Output	R-CT	[5.10] DPT_Value_1_Ucount	1 byte
648	Push-button 3 encoder 16 bit	Output	R-CT	[9] 9.xxx	2 bytes
649	Button 3 Scene (call up)	Output	R-CT	[18,001] DPT_SceneControl	1 byte
650	Button 3 NTC measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
651	Button 3 NTC external measured value	Input	-WC-	[9.1] DPT_Value_Temp	2 bytes
652	Button 3 NTC total measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
653	Button 3 NTC malfunction	Output	R-CT	[1.1] DPT_Switch	1 bit
654	Push-button 4 long-term	Output	R-CT	[1.8] DPT_UpDown	1 bit
655	Push-button 4 short-term	Output	R-CT	[1.10] DPT_Start	1 bit
656	Push-button 4 switching	Output	R-CT	[1.1] DPT_Switch	1 bit
657	Push button 4 dimming	Input/ Output	RWCT	[3.7] DPT_Control_Dimming	4 bit
658	Push-button 4 encoder 8 bit	Output	R-CT	[5.10] DPT_Value_1_Ucount	1 byte
659	Push-button 4 encoder 16 bit	Output	R-CT	[9] 9.xxx	2 bytes
660	Button 4 Scene (call up)	Output	R-CT	[18,001] DPT_SceneControl	1 byte
661	Button 4 NTC measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes

No.	Text	Function	Flags	DPT type	Size
662	Button 4 NTC external measured value	Input	-WC-	[9.1] DPT_Value_Temp	2 bytes
663	Button 4 NTC total measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
664	Button 4 NTC malfunction	Output	R-CT	[1.1] DPT_Switch	1 bit

7. Setting the parameters and functions for all models

The parameters are the same for all device models. Individual deviations are indicated in the text.

7.1. Behaviour on power failure/ restoration of power

Behaviour following a failure of the bus power supply:

The device sends nothing.

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

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

7.2. General settings

Set basic characteristics for the data transfer. A different transmission delay prevents an overload of the bus shortly after the reset.

In addition set whether the time and date are to be received as separate objects or as one common object. If time and date are received via two objects , then only a maximum of 10 seconds may elapse between receiving the date and receiving the time. Furthermore, a change of date may not occur between receiving both objects. The objects must be received by the device on the same day.

Transmission delay in seconds after reset/restoration of bus for:	
Measured values	5...300
Threshold values and switching outputs	5...300
Controller objects	5...300
Comparator and computer objects	5...300
Logic objects	5...300
Interface objects	5...300
Menu objects	5...300
Object type date and time	• two separate objects • one common object
Maximum telegram rate	1 • 2 • 5 • 10 • 20 • 50 Telegrams per second

7.3. Display

The start page, screen save, brightness and language may be set for the display of the **Sensor with display Cala KNX**. Display settings can be modified via objects, in the ETS menu or on the display.

Object control

For the settings via objects, i.e. via the bus, objects 25-30 are available. Activate the object controls as desired.

Use screen objects	• No • Yes

ETS

Set whether and/or when the ETS screen settings are to remain active. Do not use the setting "after power restoration and programming" for first commissioning.

The following parameters should be maintained	• not • after power restoration • after power restoration and programming

Adjust the wait time for the screen saver and for jumping back to the start page. Screen saver and switch to start page can be switched off below.

Screen saver wait time in seconds	1...2700; 300
No touch wait time in seconds for switch to start page	1...2700; 60

Adjust the language and display brightness You may choose between German and English as display languages.

Language	• German [de] object value: 25701 • English [en] object value: 25966
Brightness in %	1...100

Select the type of screen saver (clock or black screen) or deactivate the screen saver ("inactive"). Then select whether the display is to jump to the start page if the screen is not touched for a certain period of time.

Screen saver type	inactive • clock • screen off
Switch to start page if no touch	No • Yes

Select the menu page to be displayed as the start page.

Menu start page	• Settings • Sensor system • Temperature controller • Light 1 • Light 2 • Light 3 • Drive 1 • Drive 2 • Drive 3 • Scenes • Universal functions • RGB control • Color temperature • HCL control

Display

The possible settings on the device display are explained in the chapter *Device control on the touch display > Device settings*, page 14.

7.4. Button tone

The **Sensor with display Cala KNX** may output an acoustic signal as feedback if a key on the screen is activated. The button tone may be switched on or off via an object, in the ETS menu or on the display.

Object control

Settings via an object, i.e. via the bus, is executed with object 31 (1 = On, 0 = Off). Activate the object controls as desired.

Use button tone object	No • Yes

ETS

Set whether and/or when the ETS settings for the button tone are to remain active. Do not use the setting "after voltage return and programming" for first commissioning.

The following parameters should be maintained	• never be retained • after power restoration • after power restoration and programming

Switch the tone on or off.

Use button tone	No • Yes

Display

The possible settings on the device display are explained in the chapter *Device control on the touch display Device settings > Button tone*, page 18.

7.5. Menus

The **Sensor with display Cala KNX** may show display setting pages, sensor values and various user interface areas. This is where you select the menus the user can see. The user can call up the different menus on the display by swiping to the right or left.

If the menus for the control of the temperature, for light or drives, additional settings appear in the application.

Use the following menus	
Settings	No • Yes
Sensor system	No • Yes
Temperature control	No • Yes
Light 1	No • Yes
Light 2	No • Yes
Light 3	No • Yes
Drive 1	No • Yes
Drive 2	No • Yes
Drive 3	No • Yes
Scenes	No • Yes
Universal display	No • Yes
RGB control	No • Yes
Color temperature	No • Yes
HCL control	No • Yes

The "Settings" menu and the control options on the device display are explained in chapter *Operating the device via the touch display*, page 12.

7.5.1. Settings

These display pages allow setting the screen and button tone and show the device version.

The possible settings on the device display are explained in the chapter *Device control on the touch display > Device settings*, page 14.

7.5.2. Sensor system

The display page "Sensor system" shows the sensor measured values.

The possible appearance settings on the device display are explained in the chapter *Device control on the touch display > Sensor system (measured value display)*, page 19.

7.5.3. Temperature control

The temperature control menu is connected with the internal temperature PI control of the device!

- In order to show the temperature control menu, the temperature PI control of the device must be activated.

This sub-item of the application determines the name of the menu and the functions shown.

Insert the name to be shown on the menu page.

Name	*[free text]*

Decide whether the control mode is to be manually modified and if so, which modes may be selected.

Allow mode selection	No • **Yes**
The following modes may be activated from the menu.	
Comfort	No • Yes
Comfort extension	No • Yes
Standby	No • Yes
Eco	No • Yes
Protection	No • Yes

Then determine the nominal values on the display that may be modified. The nominal values may only be modified for the mode that is currently active.

The following nominal values can be set in the current mode	
Comfort	No • Yes
Standby	No • Yes
Eco	No • Yes
Protection	No *(cannot be modified)*

Activate the fan coil control if a heating/cooling unit with blower is to be controlled. Then the fan speed of convectors can be adjusted manually or via the corresponding actuating variable.

Use fan coil control	No • Yes

Level 0: actuating variable: 0%
Level 1: actuating variable: 1…33%
Level 2: actuating variable: 34…66%
Level 3: actuating variable: 67…100%

The possible settings on the device display are explained in the chapter *Device control on the touch display > Temperature control*, page 21.

7.5.4. Light 1-3

The interface can be adapted to the light to be switched or dimmed for every light control menu, and you can select a symbol.

Insert the name to be shown on the menu page.

Name	*[free text]*

Determine the type of control, i.e. whether the lamp is to be switched via one or two areas and whether the lamp can be dimmed.

Type of control	• one area (off/on) switchable • one area (on(off) switchable and dimmable • two areas (left off/right on) switchable • two areas (left off/right on) switchable+dimmable

Select the symbol shown.

Symbol	Circle • Light bulb

For all control types with dimming, select weather the current brightness value shall be displayed. Also determine the period of time between switching and dimming. Short tapping means a switch command. If the finger rests on the area for longer than the set time, dimming is initiated.

The dimming command can also be repeated, i.e. it is dimmed another level when the area is touched for another interval. The dimming level per repetition/interval can also be set.

Display brightness value	No • Yes
Time between switching and dimming in 0.1 sec.	2...50; 5
Repetition of the dimming command	No • **Yes**
Repetition of the dimming command for long key activation in 0.1 sec. *[when the dimming command is repeated]*	2...50; 5
Dimming by *[when the dimming command is repeated]*	100.00% • 50.00% • 25.00% • 12.50% • 6.25% • 3.13% • 1.56%

The possible settings on the device display are explained in the chapter *Device control on the touch display > Light*, page 22.

7.5.5. Drive 1-3

The key reaction for the drive to be utilised can be adjusted for each drive operation menu.

Insert the name to be shown on the menu page.

Name	*[free text]*

Determine the function, i.e. the type of drive.

Function	• Shutter • Blinds • Awning • Window
Swap UP/DOWN *[blind, shutter]* Swap RETRACT/EXTEND *[awning]* Swap OPEN/CLOSE *[window]*	No • Yes

Set whether a slider should be displayed for operation and whether the current movement position should be displayed in percent.

Use slide bar for movement position	No • Yes
Invert slide bar	No • Yes
Display movement position	No • Yes
Display slat position *[blind only]*	No • Yes

Select the mode for the touch keys. Depending on the mode, various other parameters must be set.

Mode	• Standard • Standard inverted • Comfort mode • Dead man's switch

The other setting options correspond to those of the interface inputs. For this observe chapter *Control modes for drive control*, page 77.

The possible settings on the device display are explained in the chapter *Device control on the touch display > Drive (shading, window)*, page 25.

7.5.6. Scenes

For the scene control, a group address for scenes must be filed in the KNX system. The output object 'Scene X' of **Cala KNX** is linked to this group address. When calling or saving the scene, the scene number and, if applicable, the information 'saving' are sent via the object. With the help of the group address, it is forwarded to the scene inputs of the devices linked with the address.

In this subitem of the application the four scenes of the scene operating page are defined.

Insert the name to be shown on the menu page.

Name	*[free text]*

There are four fields for scenes on the scene page. Now define these scene memories.

Activate the scene memory and set name and scene number.

Use scene memory 1/2/3/4	No • **Yes**
Name	*[free text]*
Scene no.	0...63

Specify whether the scene can only be recalled or also saved. The storage is done by holding the button for a longer time. If this feature is enabled, set how long the key must be pressed to recognize a save command.

Scene function	• Activate • Activate and save
Hold push button down longer than (in 0.1s) --> Scene save *(if "and save" has been selected)*	1...50; 10

The possible settings on the device display are explained in the chapter *Device control on the touch display* > Scenes, page 26.

7.5.7. Universal display

In this subitem of the application, the four display areas of the universal display are defined.

Insert the name to be shown on the menu page.

Name	*[free text]*

There are four display areas on the Universal display page. Now define the individual fields.

Select a function. 1/0 (on / off) as well as different 8 bit, 16 bit or 32 bit values can be displayed.

Function 1/2/3/4	• do not use • 1/0 • 8 bit value 0...255 • 8 bit value 0...100% • 8 bit value 0...360° • 16 bit value counter with math. symbol • 16 bit value counter without math. symbol • 16 bit value floating point • 32 bit value counter with math. symbol • 32 bit value counter without math. symbol • 32 bit value floating point

Enter the desired name and unit.

Name	*[free text, 8 characters]*
Unit	*[free text, 3 characters]*

The possible settings on the device display are explained in the chapter *Device control on the touch display* > Universal display, page 27.

7.5.8. RGB control

This sub-item of the application determines what the menu is called and what is sent when switching off.

Insert the name to be shown on the menu page.

Name	*[free text]*

Select whether the 3-byte object (RGB in one object) and the three 1-byte objects (separate objects for red, green and blue) should have the value 0 when switched off or nothing.

The 3-byte object should send a 0 value if switched off	No • Yes
The three 1-byte objects should send a 0 value if switched off	No • Yes

The possible settings on the device display are explained in the chapter *Device control on the touch display* > RGB control, page 28.

7.5.9. Color temperature

In this sub-item of the application, it is determined how the menu is called and the configuration options are defined.

Insert the name to be shown on the menu page.

Name	*[free text]*

Select the increment for the color temperature change and set the minimum and maximum settable value. Observe the specifications of the luminaire to be controlled.

Increment for temperature change in K	1 • 2 • 5 • 10 • 20 • 50 • 100 • 200 • 500 • 1000 • 2000 • 5000
Minimum variable value in K	0 ... 65535
Maximum variable value in K	0 ... 65535

The possible settings on the device display are explained in the chapter *Device control on the touch display* > Color temperature, page 29.

7.5.10. HCL control

In this sub-item of the application, it is determined how the menu is called and the configuration options are defined. In addition, sequences can be configured.

Insert the name to be shown on the menu page.

Name	*[free text]*

General HCL settings

The HCL control is interrupted when a change to manual (with switching, brightness or color temperature) is carried out via the objects 86-88. These objects can be linked with switching commands from on-site buttons for example. Also the HCL control menu of the display can be used to switch to manual.

Set the automatic reset, which ensures that the HCL control is restarted. The reset can be triggered via an object or after the expiration of the time set here.

Reset of automatic takes place	• according to time • on receipt of object • on receipt of object or according to time
Reset at value *(on reset on receipt of object)*	0 • 1
Time in seconds *(on reset according time)*	1 ... 36000; 3600

Set the behavior of the start / stop object, which indicates whether the HCL control is active or not. And set the behavior of the object, which indicates whether the automatic is running or has been interrupted by manual intervention.

Start/Stop object is at value	• 1 = start | 0 = stop • 0 = start | 1 = stop
Start/Stop object value after reset	0 • 1
Automatic/Manual status object is at value	• 1 = automatic | 0 = manual • 0 = manual | 1 = automatic
Automatic/Manual object value after reset	0 • 1

Set whether or in which cases times, brightnesses and color temperatures changed on the display should be saved. And determine from which change on brightness and color temperature are sent and thus the change should take effect.

Changed times, brightnesses and color temperatures shall be saved	• not • after power supply restoration • after power supply restoration and programming
Send brightness values in case of change from	1...50%; 5
Send color temperature values in case of change from	1...500 K; 50

Sequence 1/2/3/4/5/6/7/8

Set as many sequences as you need. With the same start and stop times (eg 0:00 o'clock - 0:00 o'clock) the sequence is skipped. The sequence 1 starts with the stop values of the sequence 8, therefore the values of the sequence 8 should always be set. Sequences 2-8 always begin with the stop value of the previous sequence.

First, set whether or not the sequence should be enabled for use after a reset. Unreleased sequences are skipped. Each sequence can be enabled or disabled for use directly on the **Cala KNX** display.

Release after reset	No • Yes

Set a start time, and a time, brightness and color temperature for the end of the sequence.

Start time	
Hour	0...23
Minute	0...59
Second	0...59
Stop time	
Hour	0...23
Minute	0...59
Second	0...59
Brightness at stop time in %	0...100; 50
Color temperature at stop time in Kelvin	1500...6500; 2700

The possible settings on the device display are explained in the chapter *Device control on the touch display* > HCL control, page 30. Here, all sequences can be edited and released or blocked for use.

7.6. Variable comparator

The integrated variable comparators can output maximum, minimum and average values.

Use comparator 1/2/3/4	No • Yes

7.6.1. Control variable comparator 1/2/3/4

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

Output delivers	• 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 *(if sent periodically)*	5 s • 10 s • 30 s • ... • 5 min • ... • 2 h

At and above change of *(if sent on change)*	1% • 2% • 5% • 10% • 20% • 25% • 50%
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 value
Sent value in %	0 ... 100
output sends on release (with 2 seconds release delay)	• the current value • the current value after receipt of an object

7.7. Computer

Activate the multi-functional computer, with which the input data can be changed by calculation, querying a condition or converting the data point type. The menus for the further setting of the computer are then displayed.

Computer 1/2/3/4/5/6/7/8	No • Yes

7.7.1. Computers 1-8

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

Maintain the	
input values received via communication objects	• never • after power supply restoration • after power supply restoration and programming

Select the function set the input mode and starting values for input 1 and input 2.

Function (I = Input)	• Prerequisite: E1 = E2 • Prerequisite: E1 > E2 • Prerequisite: E1 >= E2 • Prerequisite: E1 < E2 • Prerequisite: E1 <= E2 • Prerequisite: E1 - E2 >= E3 • Prerequisite: E2 - E1 >= E3 • Prerequisite: E1 - E2 amount >= E3 • Calculation: E1 + E2 • Calculation: E1 - E2 • Calculation: E2 - E1 • Calculation: E1 - E2 Amount • Calculation: Output 1 = E1 × X + Y | Output 2 = E2 × X + Y | • Transformation: General
Tolerance for comparison *(in the case of prerequisite E1 = E2)*	0 ... 4,294,967,295
Input type	[Selection options depending on the function] • 1 bit • 1 byte (0...255) • 1 byte (0%...100%) • 1 byte (0°...360°) • 2 byte counter without math. symbol • 2 byte counter with math. symbol • 2 byte floating point • 4 byte counter without math. symbol • 4 byte counter with math. symbol • 4 byte floating point
Starting value E1 / E2 / E3	[Input range depending on the type of input]

Prerequisites

When querying the prerequisites set the output type and output values at different statuses:

Output type	• 1 bit • 1 byte (0...255) • 1 byte (0%...100%) • 1 byte (0°...360°) • 2 byte counter without math. symbol • 2 byte counter with math. symbol • 2 byte floating point • 4 byte counter without math. symbol • 4 byte counter with math. symbol • 4 byte floating point
Output value *(if applicable output value A1 / A2)*	

if the condition is met	0 [Input range depending on the type of output]
if the condition is not met	0 [Input range depending on the type of output]
if the monitoring time period is exceeded	0 [Input range depending on the type of output]
if blocked	0 [Input range depending on the type of output]

Set the output send pattern.

Output sends	• on change • on change and after reset • on change and periodically • when receiving an input object • when receiving an input object and periodically
Type of change *(is only sent if "on change" is selected)*	• on each change • on change to condition met • on change to condition not met
Send cycle *(if sent periodically)*	5 s ... 2 h; 10 s

Set the text to be displayed for conditions met / not met.

Text if the condition is met	[Free text max. 14 chars.]
Text if the condition is not met	[Free text max. 14 chars.]

If applicable set the send delays.

Send delay in the event of change to the condition is met	none • 1 s • ... • 2 h
Send delay in the event of change to the condition is not met	none • 1 s • ... • 2 h

Calculations and transformation

For calculations and transformations set the output values to the various conditions:

Output value (if applicable A1 / A2)	
if the monitoring time period is exceeded	0 [Input range depending on the type of output]
if blocked	0 [Input range depending on the type of output]

Set the output send pattern.

Output sends	• on change • on change and after reset • on change and periodically • when receiving an input object • when receiving an input object and periodically
on change of *(only if calculations are transmitted for changes)*	1 ... [Input range depending on the type of input]
Send cycle *(if sent periodically)*	5 s ... 2 h; 10 s

For **Calculations of the form output 1 = E1 × X + Y | output 2 = E2 × X +Y** define the variables X and Y. The variables can have a positive or negative sign, 9 digits before and 9 digits after the decimal point.

Formula for output A1: A1 = E1 × X + Y	
X	1.00 [free input]
Y	0.00 [free input]
Formula for output A2: A2 = E2 × X + Y	
X	1.00 [free input]
Y	0.00 [free input]

Further settings for all formulas

If necessary, activate the input monitoring. Set which inputs are to be monitored, at which intervals the inputs are to be monitored and what value the "monitoring status" should have, if the monitoring period is exceeded without feedback.

Use input monitoring	No • Yes
Monitoring of	• E1 • E2 • E3 • E1 and E2 • E1 and E3 • E2 and E3 • E1 and E2 and E3 [depending on the function]
Monitoring period	5 s • ... • 2 h; 1 min
Value of the object "monitoring status" if period is exceeded	0 • 1

If necessary, activate the computer block and set what a 1 or 0 at the block entry means and what happens in the event of a block.

Use block	No • Yes
Analysis of the blocking object	• At value 1: block | At value 0: release • At value 0: block | At value 1: release

Value before first call	0 • 1
Output pattern On block	• do not send anything • send value
On release	• as send pattern [see above] • send current value immediately

7.8. Logic

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

Activate the logic inputs and assign object values up to first call.

Use logic inputs	Yes • No
Object value prior to first call 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 8	not active • active

OR logic

OR logic 1	not active • active
OR logic ...	not active • active
OR logic 8	not active • active

7.8.1. AND logic 1-8 and OR logic outputs 1-8

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
Output value If block is active	1 • 0
Output value if monitoring period is exceeded	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
Output value object A if block is active	0 ... 255 / 100% / 360° / 127; 0
Output value object B if block is active	0 ... 255 / 100% / 360° / 127; 0
Output value object A if monitoring period is exceeded	0 ... 255 / 100% / 360° / 127; 0
Output value object B if monitoring period is exceeded	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.

Use block	No • Yes
Analysis of the blocking object	• At value 1: block | At value 0: release • At value 0: block | At value 1: release
Blocking object value before first call	0 • 1
Output pattern 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]

Monitoring

If necessary, activate the input monitoring. Set which inputs are to be monitored, at which intervals the inputs are to be monitored and what value the "monitoring status" should have, if the monitoring period is exceeded without a feedback being given.

Use input monitoring	No • Yes
Input monitoring	• 1 • 2 • 3 • 4 • 1 + 2 • 1 + 3 • 1 + 4 • 2 + 3 • 2 + 4 • 3 + 4 • 1 + 2 + 3 • 1 + 2 + 4 • 1 + 3 + 4 • 2 + 3 + 4 • 1 + 2 + 3 + 4
Monitoring period	5 s • ... • 2 h; 1 min
Output behaviour on exceeding the monitoring time	• Do not send message • Send value exceeding [= value of the parameter "monitoring period"]

7.8.2. 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

For devices with temperature sensor:

Temperature sensor malfunction ON
Temperature sensor malfunction OFF
Switching output 1 Temperature
Switching output 1 Temperature inverted
Switching output 2 Temperature
Switching output 2 Temperature inverted
Switching output 3 Temperature
Switching output 3 Temperature inverted
Switching output 4 Temperature
Switching output 4 Temperature inverted
Comfort temperature controller active
Comfort temperature controller inactive
Standby temperature controller active
Standby temperature controller inactive

Eco temperature controller active
Eco temperature controller inactive
Frost protection temperature controller active
Frost protection temperature controller inactive
Heating 1 temperature controller active
Heating 1 temperature controller inactive
Heating 2 temperature controller active
Heating 2 temperature controller inactive
Cooling 1 temperature controller active
Cooling 1 temperature controller inactive
Cooling 2 temperature controller active
Cooling 2 temperature controller inactive

For devices with humidity sensor:

Humidity sensor malfunction ON
Humidity sensor malfunction OFF
Switching output 1 Humidity
Switching output 1 Humidity inverted
Switching output 2 Humidity
Switching output 2 Humidity inverted
Switching output 3 Humidity
Switching output 3 Humidity inverted
Switching output 4 Humidity
Switching output 4 Humidity inverted
Switching output coolant temperature
Switching output coolant temperature inv.
Room temperature is comfortable
Room temperature is uncomfortable
Humidity controller de-humidification 1 active
Humidity controller de-humidification 1 inactive
Humidity controller de-humidification 2 active
Humidity controller de-humidification 2 inactive
Humidity controller humidification active
Humidity controller humidification 1 inactive

For devices with CO_2 sensor:

CO2 sensor malfunction ON
CO2 sensor malfunction OFF
Switching output 1 CO2
Switching output 1 CO2 inverted
Switching output 2 CO2
Switching output 2 CO2 inverted
Switching output 3 CO2
Switching output 3 CO2 inverted
Switching output 4 CO2
Switching output 4 CO2 inverted
CO2 controller ventilation 1 active
CO2 controller ventilation 1 inactive

CO2 controller ventilation 2 active
CO2 controller ventilation 2 inactive

7.8.3. 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:

Switching output AND logic 1
Switching output AND logic 1 inverted
Switching output AND logic 2
Switching output AND logic 2 inverted
Switching output AND logic 3
Switching output AND logic 3 inverted
Switching output AND logic 4
Switching output AND logic 4 inverted
Switching output AND logic 5
Switching output AND logic 5 inverted
Switching output AND logic 6
Switching output AND logic 6 inverted
Switching output AND logic 7
Switching output AND logic 7 inverted
Switching output AND logic 8
Switching output AND logic 8 inverted

7.9. Button interfaces

Mechanical buttons or temperature sensors T-NRC (Elsner Elektronik item number 30516) can be attached to the four analogue/digital inputs of the **Cala KNX**.

Activate the interfaces you want to use.

Use interface 1 / 2 / 3 / 4	No • Yes

7.9.1. Interface 1-4

Choose a function:

Bus function	• Switch • Changeover switch • Shutter • Blinds • Awning • Window • Dimmer • 8-bit encoder • 16-bit encoder • Scene activation / scene saving • Temperature sensor NTC

Input as switch:

If a button with switch function is assigned to the input, select the bus function "Switch" and specify which value is sent when pressing/releasing the button and when it will be sent.

Bus function	**Switch**
Command when pressing the button	• send 0 • send 1 • do not send telegram
Command when releasing the button	• send 0 • send 1 • do not send telegram
Send value	• on change • for change to 1 • for change to 0 • for change and cyclical • for change to 1 and cyclical • for change to 0 and cyclical
Send all values *(only if sent as "cyclical")*	5 s ... 2 h

Input as selector switch:

If a button with switch function is assigned to the input, select the bus function "Selector switch" and specify if the button should switch when pressed/released..

Bus function	**Selector switch**
Command when pressing the button	• selector switch • do not send telegram
Command when releasing the button	• selector switch • do not send telegram

Input to shutter, blinds, awning or window control:

If the input to the drive control is used via the bus, select the bus function "shutter", "awning", "blinds" or "window" and specify the button function and control mode.

Function	**Shutter / blinds / awning / window**	
Button function	Up • Down Up • Down • Up/ Down On • Off • On/Off Open • Closed • Open/Closed	(shutter) (blinds) (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” auf Seite 77

Input as dimmer:

If the input is used as a dimmer, select the bus function "Dimmer" and specify the button function, time interval (switching/dimming) and if requested, the repeat interval for a long button press.

Function	**Dimmer**
Button function	brighter • darker • brighter/darker
Time between switching and dimming (in 0.1 s)	1...50; 5
Repeat the dimm command	no • yes
Repeat the dimm command for a long button press *(if dimm command is repeated)*	every 0.1 s • every 2 sec; every 0,5 sec
Dim by *(if dimm command is repeated)*	1,50% • 3% • 6 % • 12,50% • 25% • 50%

Input 8 bit encoder:

If the input is to be used as an 8bit encoder, select the "8 bit encoder" bus function and specify which value will be sent.

Bus function	**8 bit encoder**
Value	-6707600...6707600; 0

Input 16 bit encoder:

If the input is to be used as a 16bit encoder, select the "16 bit encoder" bus function and specify which value will be sent.

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

Input for scenario control:

If the input is to be used for recalling and saving a scene, select the bus function "scene call-up" and decide whether the button should be used to save the scene as well (keep pressed for longer).

Bus function	**Scenario recall**
Scenario no.	0...63
Scenario function	• Activate • Activate and save
Press key for longer than (in 0.1 s) Scenario saving *only for saving*	1...50

Temperature sensor

If a temperature sensor T-NTC is connected to the input, set the behaviour (malfunction object, transmission behaviour) and mixed-value calculation here. If the measured values of the sensor should deviate from the actual temperature values (e.g. in case the installation site is not in an ideal position), this may be offset and corrected.

Bus function	**Temperature sensor NTC**
Use malfunction object	Yes • No
Offset in 0.1°C	-50...50; 0
Use external measured value	Yes • No
Ext. Measured value portion of the total reading *only if an external value is used*	5% • ... • 50% • ... • 100%
All of the following settings then pertain to the total measured value	
Send behaviour	• periodically • on change • on change and periodically
On change of *if transmitted on change*	0.1°C • ... • 0.5°C • ... • 5.0°C
Send cycle *if transmitted periodically*	5 s...2 h

7.9.2. Control modes for drive control

Behaviour on button actuation in standard control mode:

	short:	**press and hold:**
Blind	Stop/step	Open
Roller Shutter	Open	Stop
Awning	Stop	Retract
Window	Stop	Close

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.

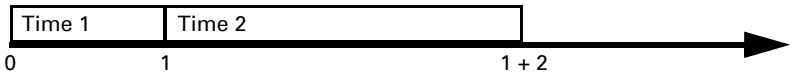
Control mode	**Standard inverted**
Behavior during button operation: short = Up or Down long = Stop/Step	
Time between short and long in 0.1 seconds	1...50; 10
Repeat the step command for a long button press	every 0.1 s • every 2 sec; every 0.5 sec

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. 28
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	

8. Temperature parameter settings

In the following all parameters are described that are found in devices with a temperature sensor, i.e. in Cala KNX T, Cala KNX TH and Cala KNX AQS/TH.

8.1. Temperature Measurement

Select, 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 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 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%
Sending pattern for internal and total measured value	• 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 • ... • 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 and maximum value	No • Yes

8.2. Temperature threshold values

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

Use threshold value 1/2/3/4	Yes • No

8.2.1. Threshold value 1, 2, 3, 4

Threshold value

Set, in which cases **threshold values and delay times** received via object are to be retained. The parameter is only taken into consideration if the setting via object is ac-

tivated 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).

Maintain the	
threshold values and delays received via communication objects	• never • after power supply restoration • after power supply restoration and programming

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; 200

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**
Start threshold value in 0.1°C valid until first communication	-300 ... 800; 200
Object value limit (min) in 0.1°C	-300...800
Object value limit (max) in 0.1°C	-300...800
Type of threshold value change	Absolute value • Increase/decrease
Increment *(upon increase/decrease change)*	0.1°C • ... • 5°C

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

Hysteresis setting	in % • absolute
Hysteresis in 0.1°	0...1100; 50
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

8.3. 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).

Maintain the	
Target values and extension time received via communication objects	• never • after power supply restoration • after power supply restoration and programming

For an adequate regulation of the ambient 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) e. g. with the window open.

The settings for the temperature control include the setpoint 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
Value of the blocking object after reset	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 • Dual-level cooling • Single-level heating + single-level cooling • Dual-level heating + single-level cooling • Dual-level heating + dual-level cooling

General setpoint values

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

Setting the setpoint values	• with separate setpoint values with Switching object • with separate setpoint values without Switching object • with comfort setpoint as a basis with Switching object • with comfort setpoint as a basis without Switching object
Behaviour of the switching object at value *(with switching object)*	• 0 = Heating | 1 = Cooling • 1 = Heating | 0 = Cooling
Value of the switching object after reset *(with switching object)*	0 • 1

The **increment** for the setpoint changes is predefined. Whether the change only remains temporarily active (not saved) or is also retained after power supply restoration (and programming), is specified in the first section of "General control". This also applies to a comfort extension.

Increment for setpoint changes (in 0.1 °C)	1... 50; 10

The control may be reset to comfort mode from eco mode, which is used as night mode, via the comfort extension. This allows the user to maintain the comfort setpoint value for a longer time, e.g. when having guests. The duration of this comfort extension period is set. After the comfort extension period expires, the system returns to eco mode.

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

Comfort Setpoint

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

Starting heating/cooling setpoint (in 0.1 °C) valid until 1st communication *(not upon saving the setpoint value after programming)*	-300…800; 210

If setpoint 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.

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…200; 50
Increase by up to (in 0.1°C)	0…200; 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 *(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/cooling setpoint (in 0.1 °C) valid until 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 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/cooling setpoint (in 0.1 °C) valid until 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 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	less than • 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

8.3.1. 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)	0...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

8.3.2. 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)	0...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.

8.3.3. Fan Coil Control

The fan coil control enables the regulation of the fan of convector heating/cooling systems.

Activate the fan coil control.

Use fan coil control	No • **Yes**

In fan coil control, the fan is automatically controlled by one or, in multi-level systems, several control variables for heating or cooling. Select which actuating variable(s) are to control the output. The selection depends on the type of heating/cooling control and the settings made for the actuating variables.

Output is controlled via actuating variable	• Heating 1 • Heating 2 • Cooling 1 • Cooling 2 • Heating 1 and cooling 1 • Heating 2 and cooling 1 • Heating 1 and cooling 2 • Heating 2 and cooling 2

Select whether the first fan level should also be on when the second and third level are running and whether the second fan level should also be on when the third level is running.

Switch Level 1 on also with Level 2 and 3	No • Yes
Switch Level 2 on also with Level 3	No • Yes

Set which mode is to be active after a reset.

Mode after reset	• Manual • Automatic (e.g. controller actuating variable)

8.4. Summer Compensation

With the summer compensation the target value for the room temperature can automatically be adapted by cooling at higher outdoor temperatures. The objective is to prevent a too great a difference between indoor and outdoor temperature in order to keep the energy consumption low.

Activate the summer compensation.

Use summer compensation	No • **Yes**

Using the points 1 and 2, define the outdoor temperature range in which the target value for the indoor temperature is to be adapted linearly. Then, specify which indoor temperature target values are to be valid below point1 and above point 2.

Standard values according to DIN EN 60529

Point 1: External temperature = 20°, Target value = 20°C.
Point 2: External temperature = 32°, Target value = 26°C.

Characteristic curve description:	
External temperature point 1 (in 0.1°C increments)	0 ... 500 ; 200
Outdoor temperature point 2 (in 0.1°C increments)	0 ... 500 ; 320

below point 1 the target value is (in 0.1°C)	0 ... 500 ; 200
above point 2 the target value is (in 0.1°C)	0 ... 500 ; 260

Set the send pattern for the summer compensation.

Send pattern	• periodically • on change • on change and periodically
on change of *(if sent on change)*	0.1°C • 0.2°C • 0.5°C • 1°C • 2°C • 5°C
Send cycle *(if sent periodically)*	5 s ... 2 h; 1 min

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

Use block	No • Yes
Analysis of the blocking object	• At value 1: block | At value 0: release • At value 0: block | At value 1: release
Blocking object value before first call	0 • 1
Action when locking	• do not send • Send value
Value (in increments of 0.1°C) *(if a value is sent during blocking)*	0 ... 500; 200

9. Humidity parameter settings

In the following all parameters are described that are found in devices with a humidity sensor, i.e. in
Cala KNX TH and Cala KNX AQS/TH.

9.1. Humidity Measurement

Select, 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 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 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%
Sending pattern for internal and total measured value	• 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 • ... • 20.0% 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" objects to reset the values to the current readings. The values are not retained after a reset.

Use minimum and maximum value	No • Yes

9.2. Humidity threshold values

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

Use threshold value 1/2/3/4	Yes • No

9.2.1. Threshold value 1, 2, 3, 4

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 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).

Maintain the	
threshold values and delays received via communication objects	• never • after power supply restoration • after power supply restoration and programming

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	1 ... 1000; 650

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**
Starting threshold value in 0.1% RH valid until first communication	1 ... 1000; 650
Object value limit (min.) in 0.1%RH	1...1000
Object value limit (max.) in 0.1%RH	1...1000
Type of threshold value change	Absolute value • Increase/decrease
Increment *(upon increase/decrease change)*	0.1% RH • ... • 2.0% RH • ... • 20.0% RH

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

Hysteresis setting	in % • absolute
Hysteresis in 0.1% RH	0...1000; 100
Hysteresis 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

9.3. 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 with display Cala KNX 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 | 0 = release • 0 = block | 1 = release
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

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).

Maintain the	
setpoint value received via communication object	• never • after power supply restoration • after power supply restoration and programming

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.

Start setpoint in % valid until first communication *(not upon saving the setpoint value after programming)*	0 ... 100; 50
Object value limit (min.) in %	0...100; 30
Object value limit (max.) in %	0...100; 70

Type of setpoint value change	Absolute value • Increase/decrease
Increment *(upon increase/decrease change)*	1% • 2% • 3% • 5% • 10%

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; 10

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; 10

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

9.4. Dewpoint measurement

The **Sensor with display Cala KNX** calculates the dewpoint temperature and can output the value to the bus.

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

9.4.1. 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).

Maintain the	
offset received via communication object	• 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...200; 30
Increment for offset change	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 setting	in % • absolute
Hysteresis of the threshold value in % *(for setting in %)*	0 ... 50; 20
Threshold value hysteresis in 0.1°C increments *(at absolute setting)*	0 ... 1000; 50
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

9.5. Absolute humidity

The absolute air humidity value is detected by the **Cala KNX** 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

9.6. Comfort field

The **Sensor with display Cala KNX** 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

Specify the **sending pattern**, a **Text** for comfortable and uncomfortable and the **Object value**.

Sending pattern	• never • periodically • on change • on change and periodically
Text for comfortable	[Free text max. 14 chars.]
Text for uncomfortable	[Free text max. 14 chars.]
Object value is at	• comfortable = 1 | uncomfortable = 0 • comfortable = 0 | uncomfortable = 1
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

10. CO_2 parameter settings

In the following all parameters are described that are found in devices with a carbon dioxide sensor, i.e. in Cala KNX AQS/TH.

10.1. CO2 Measurement

Select, 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 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. 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%
Sending pattern for internal and total measured value	• never • periodically • on change • on change and periodically
At and above change of (relative to the last measured value) *(if sent on change)*	2% • 5% • ... • 50%
Send cycle *(if sent periodically)*	5 s • 10 s • ... • 2 h

The **maximum reading** can be saved and sent to the bus. Using the "Reset CO2 maximum value" objects, the value can be reset to the current reading. The value is not retained after a reset.

Use maximum value	No • Yes

10.2. CO2 threshold values

Activate the required CO2 threshold value. The menus for setting the threshold values are displayed.

Use threshold value 1/2/3/4	Yes • No

300 ppm ... 1000 ppm: fresh air
1000 ppm ... 2000 ppm: used air

1000 ppm = 0.1 %

10.2.1. Threshold value 1, 2, 3, 4

Threshold value

Set, in which cases **threshold values and delay times** 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).

Maintain the	
threshold values and delays received via communication objects	• never • after power supply restoration • after power supply restoration and programming

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 parameters:

Set the threshold values and hysteresis directly.

Threshold value setting using	**Parameter** • Communication objects
Threshold value in ppm	0 ... 2000; 1200

Threshold value setting using a communication object:

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

During initial commissioning, a threshold value must be defined, which will be valid until the first 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 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**
Start threshold value in 0.1°C valid until first communication	-300 ... 800; 200
Limitation of object value (min) in ppm	10...2000
Limitation of object value (max) in ppm	1...2000; 1000
Type of threshold value change	Absolute value • Increase/decrease
Increment in ppm *(upon increase/decrease change)*	1 • 2 • 5 • 10 • 20 • ... • 200

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

Hysteresis setting	in % • absolute
Hysteresis in ppm	0...2000; 500
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 first 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 first 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

10.3. CO2 PI-control

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

Use control	**Yes** • No

General control

The **Sensor with display Cala KNX** 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 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
at and above change of (in ppm)	1...20; 2
Cycle (*if sent periodically)*	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
Cycle (*if sent periodically)*	5 s • 10 s • ... • 2 h

Controller setpoint

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

Setpoint value setting using parameters:

Set the setpoint value directly.

Specified setpoint using	**Parameter** • Communication objects
Target value in ppm	400…5000; 800

Setpoint value setting via communication object:

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.

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 given in which the setpoint value can be changed (object value limit).

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.

Threshold value setting using	Parameter • **Communication objects**
The last communicated value should be retained	• never • after power supply restoration • after power supply restoration and programming
Start setpoint value in ppm valid until first communication *(not upon saving the setpoint value after programming)*	400… 2000; 800
Object value limit (min) in 0.1°C	400…2000; 400
Object value limit (max) in 0.1°C	400…2000; 1500

Type of threshold value change	Absolute value • Increase/decrease
Increment 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 setpoint value difference between the two stages must be defined, i.e. the setpoint value which, when exceeded, triggers the switch to the 2nd level.

Target value difference between 1st and 2nd level in ppm *(for level 2 only)*	100...2000; 400

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 to the ventilation system at this point (follow the manufacturer's instructions).

Maximum control variable is reached at setpoint value/actual difference of (in ppm)	100...2000
Reset time in minutes	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 send anything • send a value
Value in % (*if a value is sent)*	0...100

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