Technical Manual

State 06/2024 - Version 1.0

# KNX Combi-Presence Detector 360° with room climate sensors

## SCN-KP360K301.03

## SCN-KP360K306.03

### Further documents:

**Data sheets:**
https://www.mdt.de/en/for-professionals/downloads/datasheets.html

**Assembly and operating instructions:**
https://www.mdt.de/en/for-professionals/downloads/assembly-and-operation-instructions.html

**Tips for MDT products:**
https://www.mdt.de/en/for-professionals/tips-tricks.html

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# 1 Content

# 2 Overview

## 2.1 Overview devices

This manual refers to the following devices (order number in bold).

- **SCN-KP360K301.03** KNX Combi-Presence Detector 360° with room climate sensors, White matt
- **SCN-KP360K306.03** KNX Combi-Presence Detector 360° with room climate sensors, Black matt

## 2.2 Functions

**Light channels**
Three individual light channels can be configured. Each channel can be assigned 1 - 3 sensors. The follow-up times for day and night, the trigger and presence sensitivity as well as the lock and unlock behaviour can be set individually per channel.

**HVAC channel**
Compared to the light channels, the separate HVAC channel (heating, ventilation, air conditioning) has adjustable observation windows that can be used to monitor the presence in the room. For example, to control the ventilation of a room.

**Alarm channel**
The alarm channel has a separate sensitivity setting and is used to detect motion in the event of absence. Monitoring can be activated by object.

**Fully automatic, half automatic, manual mode**
Fully automatic: The presence detector switches on when motion is detected and switches off again after the end of presence and the set follow-up time. Half automatic: The light must be switched on manually via an object. Regardless of the operating mode, extensive manual operation is possible at any time via the “External button short” and “External button long” objects.

**Integrated white LED light**
The integrated white LED light can be switched via the “Day/Night” object, in “Night” mode when motion is detected in a defined light channel, or via an external object. In addition, it can be switched on in “Day” and “Night” mode via a 1-byte object via object with a freely selectable brightness value.

**Brightness sensor**
With the help of the integrated brightness sensor, different switch-on thresholds can be configured for day and night.

**Constant light control**
The constant light control dims up to 3 light groups. External influences such as the sunlight or other light sources can therefore be intelligently compensated for. The brightness in the room remains constant and the function helps to save energy.

**Logic**
Four AND, OR, XOR logics can be activated. Each logic can be linked with up to two internal and up to four external logic objects. Switching commands, scenes, values or 2 bit forced guidance objects can be sent as output objects.

**Room climate sensors and controller**
In addition to CO2 and VOC, the Combi-Presence Detector also measures the room temperature and relative humidity. These measured values can be used for internal temperature and air quality control.

**Air quality traffic light**
The air quality control can be activated as a step controller (bit-, binary-, byte-coded) or as PI control. The actual value can be either the CO2 or the VOC value - in each case in combination with the relative humidity. Up to 10 external sensors can be integrated into the control. The air quality control can be customised to your own requirements, for example the hysteresis, the reset time and the proportional coefficient can be set for PI control. The setpoints or ventilation levels can be different for day and night. The control can be overridden at any time via a lock object.

**RGB-LEDs**
The RGB LEDs can indicate the status of the air quality traffic light directly on the device. Alternatively, the LEDs can be switched via external objects or signal the motion detection and blocking behaviour of the presence detector.

**Air quality control**
The air quality control can be activated as a step controller (bit-, binary-, byte-coded) or as PI control. The actual value can be either the CO2 or the VOC value - in each case in combination with the relative humidity. Up to 10 external sensors can be integrated into the control. The air quality control can be customised to your own requirements, for example the hysteresis, the reset time and the proportional coefficient can be set for PI control. The setpoints or ventilation levels can be different for day and night. The control can be overridden at any time via a lock object.

**Room temperature controller**
The setpoints for “Comfort”, “Standby” and “Night” can be configured independently of the “Basic comfort” setpoint. This ensures a high level of compatibility with many visualisations. The setpoint shift can be set classically via 1 Bit (step), 1 byte (counting pulses) and via 2 bytes (temperature difference and absolute values). This also ensures a high level of compatibility with a wide range of visualisations. Set setpoints and the operating mode can be saved and restored in the event of a bus voltage failure..

**Plain text diagnosis**
The plain text diagnosis outputs the current status of the temperature controller via a 14 byte object. Errors can be located very quickly, which makes commissioning much easier for the system integrator.

**Reference control via outdoor temperature**
In cooling mode, it is possible to adjust the setpoint via the outdoor temperature. This raises the setpoint value linearly in order to limit the temperature differences between the outdoor and indoor temperatures.

**Limiting the flow temperature**
If the flow temperature is measured with an external temperature sensor and linked by object, the maximum flow temperature can be limited.

**Additional level**
To shorten the heating phases, the temperature controller has an additional level - either as 2-point control or as PWM (switching PI control).

**Updateable via DCA app**
If necessary, the device can be updated using the MDT update tool (DCA).
The download is available free of charge at www.mdt.de and www.knx.org.

**Long Frame Support**
The device supports “long frames” (longer telegrams). These contain more user data per telegram, which significantly reduces the programming time.

## 2.3 Wiring diagram

The following figure shows an exemplary wiring diagram:

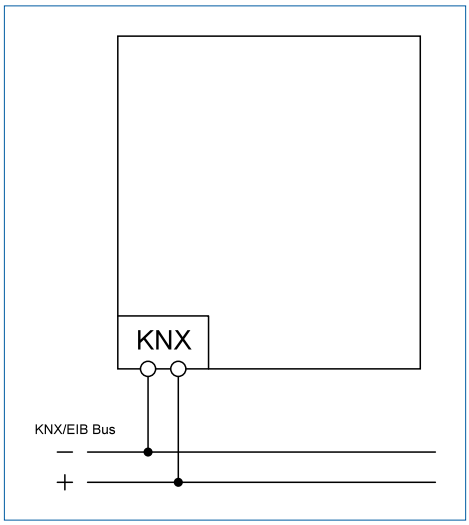


Figure 1: Wiring diagram

## 2.4 Structure & Handling

The following picture shows the structure of the device:

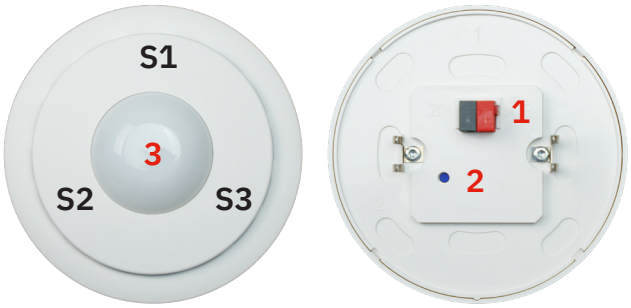


Figure 2: Structure & Handling

| | | |
|---|---|---|
| 1 | = | Bus connection terminal |
| 2 | = | Programming button |
| 3 | = | LEDs |
| S1 - S3 | = | Viewing direction of the sensors |

The presence detector should be installed in the middle of the room if possible. For constant light control, it is important that the detector is mounted at least 60 cm away from the nearest light source and placed in line with the middle light group.

The following pictures show the detection range of the presence detectors:

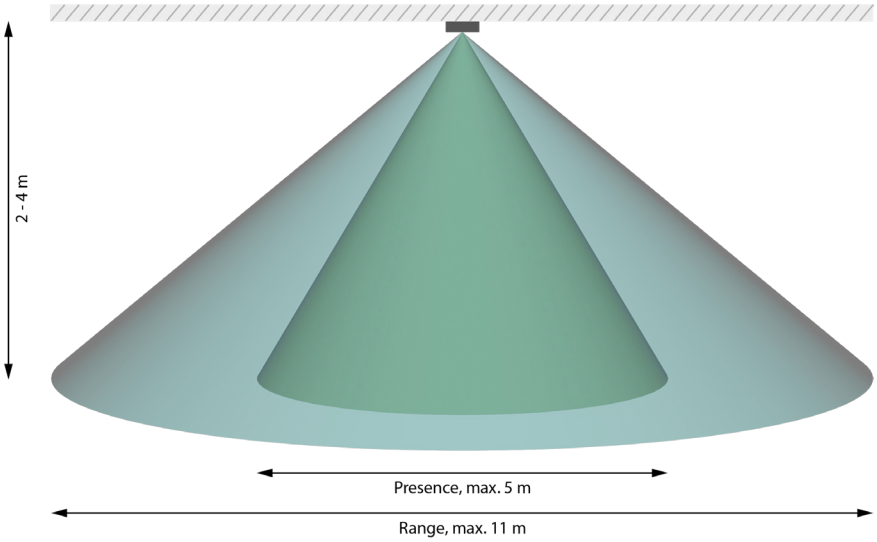


**Figure 3: Detection range of the detector**

## 2.5 Commissioning

1. Wire the device according to the wiring diagram.
2. Connect programming interface to the bus.
3. Switch on bus voltage.
4. Press the programming button on the device (red programming LED lights up continuously).
5. Set and programme the individual address in the ETS. (Programming LED turns off)
6. Configure and programme the settings in the application programme.

# 3 Communication objects

## 3.1 Standard settings of the communication objects

| Standard settings - Single channels | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object Function | Length | C | R | W | T | U |
| 1 | CO2 measurement | Send measured value | 2 Byte | ■ | ■ | | ■ | |
| 2 | CO2 measurement | External sensor input | 2 Byte | ■ | | ■ | ■ | ■ |
| 3 | CO2 measurement | Maximum value exceeded | 1 Bit | ■ | ■ | | ■ | |
| 4 | CO2 measurement | Minimum value fallen below | 1 Bit | ■ | ■ | | ■ | |
| 5 | CO2 measurement | Error external sensor | 1 Bit | ■ | ■ | | ■ | |
| 8 | VOC measurement | Send measured value | 2 Byte | ■ | ■ | | ■ | |
| 9 | VOC measurement | External sensor input | 2 Byte | ■ | | ■ | ■ | ■ |
| 10 | VOC measurement | Maximum value exceeded | 1 Bit | ■ | ■ | | ■ | |
| 11 | VOC measurement | Minimum value fallen below | 1 Bit | ■ | ■ | | ■ | |
| 12 | VOC measurement | Error external sensor | 1 Bit | ■ | ■ | | ■ | |
| 15 | Temperature measurement | Send measured value | 2 Byte | ■ | ■ | | ■ | |
| 16 | Temperature measurement | External sensor input | 2 Byte | ■ | | ■ | ■ | ■ |
| 17 | Temperature measurement | Maximum value exceeded | 1 Bit | ■ | ■ | | ■ | |
| 18 | Temperature measurement | Minimum value fallen below | 1 Bit | ■ | ■ | | ■ | |
| 19 | Temperature measurement | Error external sensor | 1 Bit | ■ | ■ | | ■ | |
| 22 | Relative humidity measurement | Send measured value | 2 Byte | ■ | ■ | | ■ | |
| 23 | Relative humidity measurement | External sensor input | 2 Byte | ■ | | ■ | ■ | ■ |
| 24 | Relative humidity measurement | Maximum value exceeded | 1 Bit | ■ | ■ | | ■ | |
| 25 | Relative humidity measurement | Minimum value fallen below | 1 Bit | ■ | ■ | | ■ | |
| 26 | Relative humidity measurement | Error external sensor | 1 Bit | ■ | ■ | | ■ | |

Table 1: Communication objects – Environment measuring channels

| Standard settings - Air quality functions | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object function | Length | C | R | W | T | U |
| 29 | Air quality traffic light | Output level 1 | 1 Bit | ■ | ■ | | ■ | |
| 30 | Air quality traffic light | Output level 2 | 1 Bit | ■ | ■ | | ■ | |
| 31 | Air quality traffic light | Output level 3 | 1 Bit | ■ | ■ | | ■ | |
| 32 | Air quality traffic light | Output level 4 | 1 Bit | ■ | ■ | | ■ | |
| 33 | Air quality traffic light | Output RGB | 3 Byte | ■ | ■ | | ■ | |
| 33 | Air quality traffic light | Output HSV | 3 Byte | ■ | ■ | | ■ | |
| 34 | Air quality traffic light | Output Scene | 1 Byte | ■ | ■ | | ■ | |
| 37 | Air quality controller | Preset setpoint | 2 Byte | ■ | | ■ | | |
| 38 | Air quality controller | Actual setpoint | 2 Byte | ■ | ■ | | ■ | |
| 39 | Air quality controller | CO2 Input 1 | 2 Byte | ■ | | ■ | | |
| 39 | Air quality controller | VOC Input 1 | 2 Byte | ■ | | ■ | | |
| 39 | Air quality controller | VOC (IAQ Index) Input 1 | 2 Byte | ■ | | ■ | | |
| 40 | Air quality controller | CO2 Input 2 | 2 Byte | ■ | | ■ | | |
| 40 | Air quality controller | VOC Input 2 | 2 Byte | ■ | | ■ | | |
| 40 | Air quality controller | VOC (IAQ Index) Input 2 | 2 Byte | ■ | | ■ | | |
| 41 | Air quality controller | CO2 Input 3 | 2 Byte | ■ | | ■ | | |
| 41 | Air quality controller | VOC Input 3 | 2 Byte | ■ | | ■ | | |
| 41 | Air quality controller | VOC (IAQ Index) Input 3 | 2 Byte | ■ | | ■ | | |
| 42 | Air quality controller | CO2 Input 4 | 2 Byte | ■ | | ■ | | |
| 42 | Air quality controller | VOC Input 4 | 2 Byte | ■ | | ■ | | |
| 42 | Air quality controller | VOC (IAQ Index) Input 4 | 2 Byte | ■ | | ■ | | |
| 43 | Air quality controller | CO2 Input 5 | 2 Byte | ■ | | ■ | | |
| 43 | Air quality controller | VOC Input 5 | 2 Byte | ■ | | ■ | | |
| 43 | Air quality controller | VOC (IAQ Index) Input 5 | 2 Byte | ■ | | ■ | | |
| 44 | Air quality controller | CO2 Input 6 | 2 Byte | ■ | | ■ | | |
| 44 | Air quality controller | VOC Input 6 | 2 Byte | ■ | | ■ | | |
| 44 | Air quality controller | Humidity Input 1 | 2 Byte | ■ | | ■ | | |
| 44 | Air quality controller | VOC (IAQ Index) Input 6 | 2 Byte | ■ | | ■ | | |
| 45 | Air quality controller | CO2 Input 7 | 2 Byte | ■ | | ■ | | |

| Standard settings - Air quality functions | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object function | Length | C | R | W | T | U |
| 45 | Air quality controller | VOC Input 7 | 2 Byte | ■ | | ■ | | |
| 45 | Air quality controller | Humidity Input 2 | 2 Byte | ■ | | ■ | | |
| 45 | Air quality controller | VOC (IAQ Index) Input 7 | 2 Byte | ■ | | ■ | | |
| 46 | Air quality controller | CO2 Input 8 | 2 Byte | ■ | | ■ | | |
| 46 | Air quality controller | VOC Input 8 | 2 Byte | ■ | | ■ | | |
| 46 | Air quality controller | Humidity Input 3 | 2 Byte | ■ | | ■ | | |
| 46 | Air quality controller | VOC (IAQ Index) Input 8 | 2 Byte | ■ | | ■ | | |
| 47 | Air quality controller | CO2 Input 9 | 2 Byte | ■ | | ■ | | |
| 47 | Air quality controller | VOC Input 9 | 2 Byte | ■ | | ■ | | |
| 47 | Air quality controller | Humidity Input 4 | 2 Byte | ■ | | ■ | | |
| 47 | Air quality controller | VOC (IAQ Index) Input 9 | 2 Byte | ■ | | ■ | | |
| 48 | Air quality controller | CO2 Input 10 | 2 Byte | ■ | | ■ | | |
| 48 | Air quality controller | VOC Input 10 | 2 Byte | ■ | | ■ | | |
| 48 | Air quality controller | Humidity Input 5 | 2 Byte | ■ | | ■ | | |
| 48 | Air quality controller | VOC (IAQ Index) Input 10 | 2 Byte | ■ | | ■ | | |
| 51 | Air quality controller | Lock controller | 1 Bit | ■ | | ■ | | |
| 52 | Air quality controller | Output control value | 1 Byte | ■ | ■ | | ■ | |
| 53 | Air quality controller | Output level 1 | 1 Bit | ■ | ■ | | ■ | |
| 54 | Air quality controller | Output level 2 | 1 Bit | ■ | ■ | | ■ | |
| 55 | Air quality controller | Output level 3 | 1 Bit | ■ | ■ | | ■ | |
| 56 | Air quality controller | Output level 4 | 1 Bit | ■ | ■ | | ■ | |
| 57 | Air quality controller | Override level | 1 Byte | ■ | | ■ | | |
| 57 | Air quality controller | Override control value | 1 Byte | ■ | | ■ | | |
| 258 | Day/Night - Air quality controller | Day = 1 / Night = 0<br>Night = 1 / Day = 0 | 1 Bit | ■ | | ■ | ■ | ■ |

Table 2: Communication objects – Air quality functions

| Standard setting – Logic Comparator | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object function | Length | C | R | W | T | U |
| 60 | Logic - Comparator 1 | Input 1 | 1 Byte<br>2 Byte | ■ | | ■ | | |
| 61 | Logic - Comparator 1 | Input 2 | 1 Byte<br>2 Byte | ■ | | ■ | | |
| 62 | Logic - Comparator 1 | Input 3 | 1 Byte<br>2 Byte | ■ | | ■ | | |
| 63 | Logic - Comparator 1 | Input 4 | 1 Byte<br>2 Byte | ■ | | ■ | | |
| 64 | Logic - Comparator 1 | Input 5 | 1 Byte<br>2 Byte | ■ | | ■ | | |
| 65 | Logic - Comparator 1 | Output | 1 Byte<br>2 Byte | ■ | ■ | | ■ | |
| 66 | Logic - Comparator 1 | Lock | 1 Bit | ■ | | ■ | | |
| 67 | Logic - Comparator 1 | Info - Emergency operation | 1 Bit | ■ | ■ | | ■ | |
| **+9** | **next Comparator** | | | | | | | |

Table 3: Communication objects – Logic Comparator

| Standard settings – Temperature controller | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object function | Length | C | R | W | T | U |
| 78 | Temperature controller | Preset setpoint | 2 Byte | ■ | | ■ | | |
| 79 | Temperature controller | Preset Comfort setpoint | 2 Byte | ■ | | ■ | | |
| 79 | Temperature controller | Preset (Basic) Comfort setpoint | 2 Byte | ■ | | ■ | | |
| 79 | Temperature controller | Combined object (Heating): Preset setpoint | 8 Byte | ■ | | ■ | | |
| 79 | Temperature controller | Combined object: Preset setpoint | 8 Byte | ■ | | ■ | | |
| 80 | Temperature controller | Preset Standby setpoint | 2 Byte | ■ | | ■ | | |
| 81 | Temperature controller | Preset Night setpoint | 2 Byte | ■ | | ■ | | |
| 82 | Temperature controller | Preset Heat protection setpoint | 2 Byte | ■ | | ■ | | |
| 82 | Temperature controller | Preset Frost protection setpoint | 2 Byte | ■ | | ■ | | |
| 83 | Temperature controller | Combined object (Cooling): Preset setpoint | 8 Byte | ■ | | ■ | | |

| Standard settings – Temperature controller | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object function | Length | C | R | W | T | U |
| 84 | Temperature controller | Send current setpoint | 2 Byte | ■ | ■ | | ■ | |
| 85 | Temperature controller | Manual setpoint shift (2 Byte) | 2 Byte | ■ | | ■ | | |
| 86 | Temperature controller | Manual setpoint shift (1 Byte) | 1 Byte | ■ | | ■ | | |
| 86 | Temperature controller | Manual setpoint shift (1=+ / 0=-) | 1 Bit | ■ | | ■ | | |
| 87 | Temperature controller | Send status setpoint shift | 2 Byte | ■ | ■ | | ■ | |
| 88 | Temperature controller | Control value Heating: Send control value | 1 Byte | ■ | ■ | | ■ | |
| 88 | Temperature controller | Control value Heating: Send control value | 1 Bit | ■ | ■ | | ■ | |
| 88 | Temperature controller | Control value Heating/Cooling: Send control value | 1 Byte | ■ | ■ | | ■ | |
| 88 | Temperature controller | Control value Heating/Cooling: Send control value | 1 Bit | ■ | ■ | | ■ | |
| 89 | Temperature controller | Control value Cooling: Send control value | 1 Byte | ■ | ■ | | ■ | |
| 89 | Temperature controller | Control value Cooling: Send control value | 1 Bit | ■ | ■ | | ■ | |
| 90 | Temperature controller | Control value Heating: Send status | 1 Byte | ■ | ■ | | ■ | |
| 90 | Temperature controller | Control value Heating/Cooling: Send status | 1 Byte | ■ | ■ | | ■ | |
| 91 | Temperature controller | Control value Cooling: Send status | 1 Byte | ■ | ■ | | ■ | |
| 92 | Temperature controller | Additional level: Send control value Heating | 1 Bit | ■ | | | ■ | |
| 93 | Temperature controller | Mode selection | 1 Byte | ■ | | ■ | | |
| 94 | Temperature controller | Comfort operating mode: Comfort extension | 1 Bit | ■ | | ■ | | |
| 95 | Temperature controller | Comfort mode | 1 Bit | ■ | | ■ | | |
| 96 | Temperature controller | Night mode | 1 Bit | ■ | | ■ | | |
| 97 | Temperature controller | Mode Frost protection | 1 Bit | ■ | | ■ | | |
| 97 | Temperature controller | Mode Heat protection | 1 Bit | ■ | | ■ | | |
| 97 | Temperature controller | Mode Frost/Heat protection | 1 Bit | ■ | | ■ | | |
| 98 | Temperature controller | DPT_HVAC Mode: Send controller status | 1 Byte | ■ | ■ | | ■ | |

| Standard settings – Temperature controller | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object function | Length | C | R | W | T | U |
| 98 | Temperature controller | DPT_HVAC Status: Send controller status | 1 Byte | ■ | ■ | | ■ | |
| 99 | Temperature controller | DPT_HVAC Mode: Send controller status | 1 Byte | ■ | ■ | | ■ | |
| 99 | Temperature controller | DPT_HVAC Status: Send controller status | 1 Byte | ■ | ■ | | ■ | |
| 99 | Temperature controller | RHCC Status: Send controller status | 2 Byte | ■ | ■ | | ■ | |
| 99 | Temperature controller | DPT_RTC combined Status: Send controller status | 2 Byte | ■ | ■ | | ■ | |
| 99 | Temperature controller | DPT_RTSM combined Status: Send controller status | 1 Byte | ■ | ■ | | ■ | |
| 100 | Temperature controller | Send Frost alarm | 1 Bit | ■ | ■ | | ■ | |
| 101 | Temperature controller | Send Heat alarm | 1 Bit | ■ | ■ | | ■ | |
| 102 | Temperature controller | Receive flow temperature Heating | 2 Byte | ■ | | ■ | ■ | |
| 104 | Temperature controller | Diagnosis status | 14Byte | ■ | ■ | | ■ | |
| 105 | Temperature controller | Window contact: 0=closed / 1=open | 1 Bit | ■ | | ■ | ■ | ■ |
| 105 | Temperature controller | Window contact: 1=closed / 0=open | 1 Bit | ■ | | ■ | ■ | ■ |
| 106 | Temperature controller | Lock object Heating: Lock control value | 1 Bit | ■ | ■ | ■ | ■ | ■ |
| 107 | Temperature controller | Lock object Cooling: Lock control value | 1 Bit | ■ | ■ | ■ | ■ | ■ |
| 110 | Temperature controller | Switchover: 1=Heating / 0=Cooling | 1 Bit | ■ | | ■ | | |
| 111 | Temperature controller | Status: 1=Heating / 0=Cooling | 1 Bit | ■ | ■ | | ■ | |
| 112 | Temperature controller | Send Heating request | 1 Bit | ■ | ■ | | ■ | |
| 113 | Temperature controller | Send Cooling request | 1 Bit | ■ | ■ | | ■ | |
| 114 | Outdoor temperature | Receive measured value/reference value | 2 Byte | ■ | | ■ | | |

Table 4: Communication objects – Temperature controller

| Standard settings – PIR Channels | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object function | Length | C | R | W | T | U |
| 117 | Light channel 1 – Output 1 | Switch | 1 Bit | ■ | ■ | | ■ | |
| 117 | Light channel 1 – Output 1 (Day) | Switch | 1 Bit | ■ | ■ | | ■ | |
| 117 | Light channel 1 - Output | Dimming absolute | 1 Byte | ■ | ■ | | ■ | |

| Standard settings – PIR Channels | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object function | Length | C | R | W | T | U |
| 117 | Light channel 1 - Output | Scene | 1 Byte | ■ | ■ | | ■ | |
| 118 | Light channel 1 – Output 1 (Night) | Switch | 1 Bit | ■ | ■ | | ■ | |
| 119 | Light channel 1 – Output 2 (Additional) | Switch | 1 Bit | ■ | ■ | | ■ | |
| 120 | Light channel 1 – Input | External button short | 1 Bit | ■ | | ■ | | |
| 121 | Light channel 1 – Input | External button long | 1 Bit | ■ | | ■ | | |
| 122 | Light channel 1 – Input | External motion (Slave) | 1 Bit | ■ | | ■ | | |
| 123 | Light channel 1 – Input | Status of actuator channel | 1 Bit | ■ | | ■ | | |
| 124 | Light channel 1 – Input | Lock motion detection | 1 Bit | ■ | | ■ | | |
| 125 | Light channel 1 – Input | Forced guidance | 2 Bit | ■ | | ■ | | |
| 125 | Light channel 1 – Input | Lock object | 1 Bit | ■ | | ■ | | |
| 126 | Light channel 1 – Input | Lock object ON | 1 Bit | ■ | | ■ | | |
| 127 | Light channel 1 – Status | Automatic mode | 1 Bit | ■ | ■ | | ■ | |
| 127 | Light channel 1 – Status | Lock/Manual mode | 1 Bit | ■ | ■ | | ■ | |
| 128 | Light channel 1 – Input | Switch dark | 1 Bit | ■ | | ■ | | |
| 129 | Light channel 1 – Input | Teach-in dimming value for ON | 1 Byte | ■ | | ■ | ■ | ■ |
| 130 | Light channel 1 – Input | Follow-up time 10 - 65000 s | 2 Byte | ■ | | ■ | ■ | ■ |
| **+15** | **next Light channel** | | | | | | | |
| 177 | HVAC – Output | Switching | 1 Bit | ■ | ■ | | ■ | |
| 177 | HVAC – Output | Dimming absolute | 1 Byte | ■ | ■ | | ■ | |
| 177 | HVAC – Output | Scene | 1 Byte | ■ | ■ | | ■ | |
| 180 | HVAC – Input | External push button short | 1 Bit | ■ | | ■ | | |
| 181 | HVAC – Input | External push button long | 1 Bit | ■ | | ■ | | |
| 182 | HVAC – Input | External motion (Slave) | 1 Bit | ■ | | ■ | | |
| 183 | HVAC – Input | Status of actuator channel | 1 Bit | ■ | | ■ | | |
| 184 | HVAC – Input | Lock motion detection | 1 Bit | ■ | | ■ | | |
| 185 | HVAC – Input | Forced guidance | 2 Bit | ■ | | ■ | | |
| 185 | HVAC – Input | Lock object | 1 Bit | ■ | | ■ | | |
| 186 | HVAC – Input | Lock object ON | 1 Bit | ■ | | ■ | | |

| Standard settings – PIR Channels | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object function | Length | C | R | W | T | U |
| 187 | HVAC – Status | Automatic mode | 1 Bit | ■ | ■ | | ■ | |
| 187 | HVAC – Status | Locking/Manual mode | 1 Bit | ■ | ■ | | ■ | |
| 188 | HVAC – Input | Switch dark | 1 Bit | ■ | | ■ | | |
| 189 | HVAC – Input | Teach-in dimming value for ON | 1 Byte | ■ | | ■ | ■ | ■ |
| 190 | HVAC – Input | Follow-up time 10 - 65000 s | 2 Byte | ■ | | ■ | ■ | ■ |
| 192 | Alarm – Output | Switch | 1 Bit | ■ | ■ | | ■ | |
| 192 | Alarm – Output (Day) | Switch | 1 Bit | ■ | ■ | | ■ | |
| 193 | Alarm – Output (Night) | Switch | 1 Bit | ■ | ■ | | ■ | |
| 200 | Alarm – Input | Lock | 1 Bit | ■ | | ■ | | |
| 200 | Alarm – Input | Release | 1 Bit | ■ | | ■ | | |

Table 5: Communication objects – PIR Channels

| Standard settings – LED, Brightness, Constant light, General | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object function | Length | C | R | W | T | U |
| 209 | LED White | Switch | 1 Bit<br>1 Byte | ■ | | ■ | | |
| 210 | RGB traffic light | Input | 1 Byte<br>3 Byte | ■ | | ■ | | |
| 210 | RGB Traffic light | Input level 1 | 1 Bit | ■ | | ■ | | |
| 211 | RGB Traffic light | Input level 2 | 1 Bit | ■ | | ■ | | |
| 212 | RGB Traffic light | Input level 3 | 1 Bit | ■ | | ■ | | |
| 213 | RGB Traffic light | Input level 4 | 1 Bit | ■ | | ■ | | |
| 214 | RGB Traffic light | Brightness (1 = bright / 0 = dark) | 1 Bit | ■ | | ■ | | |
| 215 | PIR Scenes | Input | 1 Byte | ■ | | ■ | | |
| 216 | Brightness | Threshold switch | 1 Bit | ■ | ■ | | ■ | |
| 217 | Brightness | Measured value | 2 Byte | ■ | ■ | | ■ | |
| 218 | Brightness | Set switch-on threshold for light channels | 2 Byte | ■ | | ■ | | |
| 219 | Input Teach-in | Start calibration | 1 Bit | ■ | | ■ | | |

| Standard settings – LED, Brightness, Constant light, General | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object function | Length | C | R | W | T | U |
| 220 | Input Teach-in | Status absolute dimming value | 1 Byte | ■ | | ■ | | |
| 246 | Constant light | Switch | 1 Bit | ■ | | ■ | | |
| 247 | Constant light | Dimming relative | 4 Bit | ■ | | ■ | | |
| 248 | Constant light | Dimming absolute | 1 Byte | ■ | | ■ | | |
| 250 | Constant light | Lock | 1 Bit | ■ | | ■ | | |
| 251 | Constant light | Scene control | 1 Byte | ■ | | ■ | | |
| 251 | Constant light | Scenes | 1 Byte | ■ | | ■ | | |
| 252 | Constant light | Dimming absolute - middle | 1 Byte | ■ | ■ | | ■ | |
| 253 | Constant light | Dimming absolute - wall | 1 Byte | ■ | ■ | | ■ | |
| 254 | Constant light | Dimming absolute - window | 1 Byte | ■ | ■ | | ■ | |
| 255 | Constant light | Status | 1 Bit | ■ | ■ | | ■ | |
| 256 | In operation | Output | 1 Bit | ■ | ■ | | ■ | |
| 257 | Day/Night - Presence detector | Day = 1 / Night = 0<br>Night = 1 / Day = 0 | 1 Bit | ■ | | ■ | ■ | ■ |

Table 6: Communication objects – LED, Brightness, Constant light, General

| Standard settings – Logic | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Name | Object function | Length | C | R | W | T | U |
| 226 | Logic 1 | Input | 2 Byte | ■ | | ■ | ■ | ■ |
| 227 | Logic 1 | Input | 2 Byte | ■ | | ■ | ■ | ■ |
| 228 | Logic 1 | Input | | ■ | | ■ | ■ | ■ |
| 229 | Logic 1 | Input | | ■ | | ■ | ■ | ■ |
| 230 | Logic 1 | Output 1 | 1 Bit<br>2 Bit<br>1 Byte | ■ | ■ | | ■ | |
| **+5** | **next Logic** | | | | | | | |

Table 7: Communication objects – Logic

The table above shows the preset default settings. The priority of the individual communications objects and the flags can be adjusted by the user as required. The flags assign the communication objects their respective tasks in programming, where C stands for communication, R for read, W for write, T for transmit and U for update.

# 4 ETS Parameter

## 4.1 General Settings

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Startup time | 2 ... 240 s<br>**[2 s]** | Sets the time between restart and functional start-up of the device. |
| Send „In operation“ cyclically | **not active**<br>1 min – 24 h | Activation of an object and setting the sending interval. |
| Language diagnosis text | ■ **German**<br>■ English | Setting the language for the diagnosis text output. |
| Settings: Presence detector | | |
| Day/Night switchover | ■ not active<br>■ **active** | Activation/deactivation of a “Day/Night” object. |
| Value for Day/Night | ■ **Day = 1 / Night = 0**<br>■ Day = 0 / Night = 1 | Setting the polarity of the “Day/Night” object. |
| Day/Night object after bus power return | ■ no request<br>■ **request** | Setting whether the object should be actively requested after a bus power return. |
| Toggle Day/Night | ■ **at next presence**<br>■ directly on switchover | Setting when the Day/Night switchover should take effect. |
| Basic settings: Sensitivity | | |
| Trigger sensitivity “Day” | 1 – 8<br>**[6]** | Setting the trigger sensitivity in day mode. |
| Trigger sensitivity “Night” | 1 – 8<br>**[3 (low)]** | Setting the trigger sensitivity in night mode. |
| Presence sensitivity | 1 – 10<br>**[8 (high)]** | Setting the sensitivity when presence is detected. |
| Reduce sensitivity for sensors | ■ **not active**<br>■ 1--<br>■ -2-<br>■ 12-<br>:<br>■ -23 | Setting to change the sensitivity of single sensors. |
| Trigger sensitivity “Day” | 1 – 5<br>**[2]** | Changed sensitivity in day mode. |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Trigger sensitivity “Night” | 1 – 5<br>**[1 (very low)]** | Changed sensitivity in night mode. |
| Presence sensitivity | 1 – 10<br>**[8 (high)]** | Changed sensitivity for presence detection. |
| Basic settings: Brightness | | |
| Switch-on threshold “Day” | 5 – 1000 Lux<br>**[400]** | Setting the value below which the sensor is active in day mode. |
| Switch-on threshold “Night” | 5 – 1000 Lux<br>**[400]** | Setting the value below which the sensor is active in night mode. |
| Switch-off on exceedance | ■ **not active**<br>■ active | Setting whether an OFF telegram should be sent when a certain brightness threshold is exceeded. |
| Switches OFF on exceedance | 75 – 1000 Lux<br>**[800]** | Setting the threshold value from when the sensor sends an OFF telegram.<br>**Only if “Switch-off on exceedance” is activated.** |
| Fallback of forced guidance/lock/external button | | |
| Fallback of forced guidance/lock | ■ **not active**<br>■ after presence and follow-up time<br>■ after fixed time | Activation of a time for fallback from forced guidance or lock respectively. |
| Follow-up time for forced guidance/lock „Day“ | 1 s – 9 h<br>**[3 min]** | Setting a follow-up time for day/night mode.<br>**Only for “after presence and follow-up time”..** |
| Follow-up time for forced guidance/lock „Night“ | | |
| Fallback time for forced guidance/lock „Day“ | 1 s – 9 h<br>**[10 min]** | Setting a fallback time for day/night mode.<br>**Only for “after fixed time”..** |
| Fallback time for forced guidance/lock „Night“ | | |
| Fallback: External button long (Manual => Auto) | ■ not active<br>■ **after presence and follow-up time**<br>■ after fixed time | Activation of a time for fallback from override via an “external button ...” object. |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Manual mode, follow-up time at ON „Day“ | 1 s – 9 h<br>**[3 min]** | Setting a follow-up time in manual mode for ON/OFF in Day and Night mode respectively.<br>**Only for “after presence and follow-up time”.**. |
| Manual mode, follow-up time at OFF „Day“ | | |
| Manual mode, follow-up time at ON „Night“ | | |
| Manual mode, follow-up time at OFF „Night“ | | |
| Fallback time “manual mode” for ON „Day“ | 1 s – 9 h<br>**[10 min]** | Setting a fallback time in manual mode for ON/OFF in Day and Night mode respectively.<br>**Only for “after fixed time”.** |
| Fallback time “manual mode” for OFF „Day“ | | |
| Fallback time “manual mode” for ON „Night“ | | |
| Fallback time “manual mode” for OFF „Night“ | | |

Table 8: General settings

**Startup time**
This time defines when the device boots up after a restart (reset, reprogramming, return of bus voltage). This can be important if, for example, a bus reset is carried out. If there are many devices on a line, all devices would start at the same time and overload the bus. With a variable time, the devices can thus start at different times.

**“In operation”**
The “In operation” object is used to show on the bus that the device is alive. If activated, an “ON” telegram is sent cyclically.

**Language diagnosis text**
The language in which the diagnosis text is output is set here.

**Settings: Presence detector**

**Important:** The **Day/Night switchover** only affects the presence detector in the device. A separate Day/Night object for the “Room climate sensors” area is available in the “Air quality control” menu.

When activated, the polarity can then be set via “**Value for Day/Night**”.
You can also specify whether the Day/Night object should be actively **requested after a bus power return.**
“**Toggle Day/Night**” is used to specify whether the switchover is active immediately when a telegram is received or only when motion is next detected (presence).

**Basic setting: Sensitivity**
The sensitivity of the sensors is set here. “1” means very low, the higher the value, the more sensitive the sensors become. This setting influences the detection range. If the value is set low, movement is only detected relatively close to the detector. If the value is set to “8”, for example, movement is already detected at a greater distance from the detector.

**Basic setting: Brightness**
This allows a specific operating range to be specified for the Presence Detector. The parameters “**Switch-on threshold “Day/Night”**” defines the brightness threshold below which the detector detects presence. Above this threshold, no more movement is detected, but the detector does not switch off the light as soon as the brightness is exceeded; instead, the follow-up time runs normally.
The set threshold value can be changed via **object “Set switch-on threshold for light channels”**. The value always applies to the current operation. If the detector is in Day mode, the threshold for “Day” is changed. If the detector is in Night mode, the threshold for “Night” is changed.
The “**Switch-off on exceedance**” parameter causes the light channel to switch off immediately when the set value is reached. The value should not be set too low, however, as this could result in the light channel switching ON/OFF continuously.
Example: If the detector switches ON and the brightness in the room with the light switched on is brighter than the “**Switches OFF on exceedance of**” value, the channel switches off again immediately.

The “**Reduce sensitivity for sensors**” setting is used, for example, if one or more sensors are to react with a different sensitivity for structural reasons. For example, sensor 1 can work with a high sensitivity, while sensors 2 and 3 work with a reduced, lower sensitivity.

**Fallback of forced guidance/lock**
If the detector is in a certain state via forced guidance or lock, it can be defined whether it should fall back into automatic mode **after a fixed time**.
With the setting “**after presence and follow-up time**”, the presence in the room continues to be detected during forced guidance/lock. If there is now no one in the room and the follow-up time of the channel has elapsed, the set “**Manual mode follow-up time...**” starts from this point, after which the detector switches back to automatic mode.

**Fallback: External button long (Manual => Auto)**
If the detector is switched to manual mode via “External button long”, a fallback to automatic mode “after fixed time” or “after presence and follow-up time” can also be achieved here. The procedure corresponds to the description in the previous point “Fallback of forced guidance/lock”.

**Note:** ”External button short” is interpreted as movement and starts the follow-up time (adjustable in the channel), “External button long” switches to manual mode.

The following table shows the associated communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 256 | In operation – Output | 1 Bit | Sending a cyclical telegram |
| 257 | Day/Night: Presence detector – Day = 1 / Night = 0; Night = 1 / Day = 0 | 1 Bit | Input of a value, whether “Day” or “Night” |

Table 9: Communication object – General settings

## 4.2 Environment measuring channels

The following settings are available for this menu:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| CO2 measurement | ■ not active<br>■ **active** | Activation/deactivation of the measuring function. |
| VOC measurement | ■ not active<br>■ **active** | Activation/deactivation of the measuring function. |
| Temperature measurement | ■ not active<br>■ **active** | Activation/deactivation of the measuring function. |
| Relative humidity measurement | ■ not active<br>■ **active** | Activation/deactivation of the measuring function. |

**Table 10: Settings – Environment measuring channels**

Depending on the activation of the different measuring channels, a submenu appears under the main menu “Environment measuring channels”. The corresponding measuring channel can be configured there.

These are described in the following chapters

### 4.2.1 CO2 measurement

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Send measured value on change | ■ **not active**<br>■ active | Setting whether the measured value should be sent on change. |
| Send measured value on change of | 10 ... 500 ppm<br>**[20]** | Setting at which change the measured value should be sent.<br>**Only if "Send measured value on change" is active.** |
| Send measured value cyclically | **not active**<br>1 min – 60 min | Setting whether and at what interval the measured value is sent cyclically. |
| Messages | ■ **not active**<br>■ active | Activation of the message function. |
| Upper message value | 400 ... 2000 ppm<br>**[1500 ppm]** | Setting range of the upper message value.<br>**Only if „Messages" is active.** |
| Lower message value | 400 ... 2000 ppm<br>**[500 ppm]** | Setting range of the lower message value.<br>**Only if „Messages" is active.** |
| Calibration value for internal sensor | -500 ... 500 ppm<br>**[0 ppm]** | Adjustment for internal sensor. |
| Sensor internal/external | ■ **100 % internal**<br>■ 90 % internal/ 10 % external<br>■ 80 % internal/ 20 % external<br>:<br>■ 10 % intern / 90 % external<br>■ 100 % external<br>■ maximum value | Setting of the weighting between internal and external sensor. |

Table 11: Settings – CO2 measurement

The setting "**Send measured value on change**" can be used to set the change on which the sensor sends its current value. If set to "not active", the sensor does not send a value, regardless of the size of the change.
The setting "**Send measured value cyclically**" can be used to set the intervals at which the sensor sends its current measured value. The cyclical sending function can be activated or deactivated independently of the setting "Send measured value on change". Measured values are also sent if the sensor has not detected a change. If both parameters are deactivated, a value is never sent.

**Important:** After reset/programming, the first measured value is sent after approx. 1 minute.

With the “**Messages**” function, two message values (upper and lower message value) can be configured. The two functions each have their own communication object.

Principle:
If the **upper message value** is exceeded, a “1” is sent. If it is undershot again, a “0” is sent.
If the value falls below the **lower message value**, a “1” is sent. If it is exceeded again, a “0” is sent.

A correction value can be set via the parameter “**Calibration value for internal sensor**”. This is used to increase/decrease the actual measured value. If, for example, a value of “100” is set, the measured CO2 value is increased by 100 ppm.

An external sensor can be activated or deactivated via the weighting “**Sensor internal/external**”. If the weighting is set to 100% internal, no external sensor is activated and no communication object appears for the external sensor. With any other setting, an external sensor is activated and the associated object appears. The “mixed” value is sent to the bus via the “Send measured value” object.
With the “maximum value” setting, the higher of the two measured values (internal/external) is always output.

**Important:** The external sensor is monitored with a time of 30 minutes. If no new value is received within this time, only the internal sensor is used!
At the same time, an alarm with a “1” is sent to the “External sensor error” object. If an external value is received again, the alarm is reset with a “0”.

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 1 | CO2 measurement – Send measured value | 2 Byte | Sending the current CO2 measured value |
| 2 | CO2 measurement – External sensor input | 2 Byte | Receipt of an external measured value |
| 3 | CO2 measurement – Maximum value exceeded | 1 Bit | Sending a message for upper message value |
| 4 | CO2 measurement – Minimum value fallen below | 1 Bit | Sending a message for lower message value |
| 5 | CO2 measurement – Error external sensor | 1 Bit | Sending an alarm |

Table 12: Communication objects – CO2 measurement

### 4.2.2 VOC measurement

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Measured value output in | ■ **ppm**<br>■ IAQ Index<br>(Indoor Air Quality Index)<br>■ percent | Setting for how the measured value is to be output. |
| IAQ Index description | Table with IAQ levels is displayed | Information about the classification of the IAQ index (Indoor Air Quality Index).<br>**Only when "Measured value output in" is selected as "IAQ Index".** |
| Send measured value on change | ■ **not active**<br>■ active | Setting whether the measured value should be sent on change. |
| Send measured value on change of | 10 ... 500 ppm<br>**[20 ppm]** | Setting at which change the measured value should be sent.<br>■ **Unit depends on the selection of "Measured value output".**<br>■ **Only visible if "Send measured value on change" is activated.** |
| | 1 ... 50<br>**[5]** | |
| | 1 ... 20 %<br>**[5 %]** | |
| Send measured value cyclically | **not active**<br>1 min – 60 min | Setting whether and at what interval the measured value is sent cyclically. |
| Messages | ■ **not active**<br>■ active | Activation of the message function. |
| Upper message value | 100 ... 5000 ppm<br>**[2000 ppm]** | Setting the upper signal value.<br>■ **Visible when "Messages" is active.**<br>■ **Unit depends on the selection of "Measured value output".** |
| | 0 ... 500<br>**[200]** | |
| | 1 ... 100 %<br>**[50 %]** | |
| Lower message value | 100 ... 5000 ppm<br>**[1000 ppm]** | Setting the lower signal value.<br>■ **Visible when "Messages" is active.**<br>■ **Unit depends on the selection of "Measured value output".** |
| | 0 ... 500<br>**[50]** | |
| | 1 ... 100 %<br>**[10 %]** | |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Sensor internal/external | ■ **100 % internal**<br>■ 90 % internal/ 10 % external<br>■ 80 % internal/ 20 % external<br>:<br>■ 10 % intern / 90 % external<br>■ 100 % external<br>■ maximum value | Setting of the weighting between internal and external sensor. |

Table 13: Settings – VOC measurement

With the selection "**Measured value output in**" you can determine whether the VOC measured value is output in ppm or as IAQ index.

The IAQ Index (Indoor Air Quality Index) describes the indoor air quality. The classification is described with the parameter "**IAQ Index Description**" in the corresponding screen:

| IAQ Index | Air quality |
|---|---|
| 0 - 50 | excellent |
| 51 - 100 | good |
| 101 - 150 | slightly polluted |
| 151 - 200 | moderately polluted |
| 201 - 250 | heavily polluted |
| 251 - 300 | very heavily polluted |
| > 351 | extremely polluted |

Table 14: Air quality index - IAQ gradations

The setting "**Send measured value on change**" can be used to set the change on which the sensor sends its current value. If set to "not active", the sensor does not send a value, regardless of the size of the change.

The setting "**Send measured value cyclically**" can be used to set the intervals at which the sensor sends its current measured value. The cyclical sending function can be activated or deactivated independently of the setting "Send measured value on change". Measured values are also sent if the sensor has not detected a change. If both parameters are deactivated, a value is never sent.

**Important:** After reset/programming, the first measured value is sent after approx. 1 minute.

With the "**Messages**" function, two message values (upper and lower message value) can be configured. The two functions each have their own communication object.

Principle:
If the upper message value is exceeded, a "1" is sent. If it is undershot again, a "0" is sent.
If the value falls below the lower message value, a "1" is sent. If it is exceeded again, a "0" is sent.

An external sensor can be activated or deactivated via the weighting "**Sensor internal/external**". If the weighting is set to 100% internal, no external sensor is activated and no communication object appears for the external sensor. With any other setting, an external sensor is activated and the associated object appears. The "mixed" value is sent to the bus via the "Send measured value" object.
With the "maximum value" setting, the higher of the two measured values (internal/external) is always output.

**Important:** The external sensor is monitored with a time of 30 minutes. If no new value is received within this time, only the internal sensor is used!
At the same time, an alarm with a "1" is sent to the "External sensor error" object. If an external value is received again, the alarm is reset with a "0".

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 8 | VOC measurement – Send measured value | 2 Byte | Sending the actual VOC measured value |
| 9 | VOC measurement – External sensor input | 2 Byte | Receiving an external measured value |
| 10 | VOC measurement – Maximum value exceeded | 1 Bit | Sending a message for upper message value |
| 11 | VOC measurement – Minimum value fallen below | 1 Bit | Sending a message for lower message value |
| 12 | VOC measurement – Error external sensor | 1 Bit | Sending an alarm |

Table 15: Communication objects – VOC measurement

### 4.2.3 Temperature measurement

The table shows the possible settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Send measured value on change | ■ **not active**<br>■ active | Setting whether the measured value should be sent on change. |
| Send measured value on change of | 0,1 ... 2 K<br>**[0,1 K]** | Setting at which change the measured value should be sent.<br>**Only visible if "Send measured value on change" is activated.** |
| Send measured value cyclically | **not active**<br>1 min – 60 min | Setting whether and at what interval the measured value is sent cyclically. |
| Messages | ■ **not active**<br>■ active | Activation of the message function. |
| Upper message value | 20 ... 45 °C<br>**[28 °C]** | Setting range of the upper message value.<br>**Only if "Messages" is activated.** |
| Lower message value | 3 ... 30 °C<br>**[18 °C]** | Setting range of the lower message value.<br>**Only if "Messages" is activated.** |
| Calibration value for internal sensor | -10 ... 10 K<br>**[0 K]** | Adjustment for internal sensor. |
| Sensor internal/external | ■ **100 % internal**<br>■ 90 % internal/ 10 % external<br>■ 80 % internal/ 20 % external<br>:<br>■ 10 % intern / 90 % external<br>■ 100 % external | Setting the weighting between internal and external sensor. |

**Table 16: Settings – Temperature measurement**

The setting "**Send measured value on change**" can be used to set the change on which the sensor sends its current value. If set to "not active", the sensor does not send a value, regardless of the size of the change.
The setting "**Send measured value cyclically**" can be used to set the intervals at which the sensor sends its current measured value. The cyclical sending function can be activated or deactivated independently of the setting "Send measured value on change". Measured values are also sent if the sensor has not detected a change. If both parameters are deactivated, a value is never sent.

**Important:** After reset/programming, the first measured value is sent after approx. 1 minute.

With the "**Messages**" function, two message values (upper and lower message value) can be configured. The two functions each have their own communication object.

Principle:
If the upper message value is exceeded, a "1" is sent. If it is undershot again, a "0" is sent.
If the value falls below the lower message value, a "1" is sent. If it is exceeded again, a "0" is sent.

A correction value can be set via the parameter "**Calibration value for internal sensor**". This is used to increase/decrease the actual measured value. This setting makes sense if the sensor has been installed in an unfavourable location, such as above a radiator or in a draught area. The temperature sensor sends the corrected temperature value when this function is activated.

An external sensor can be activated or deactivated via the weighting "**Sensor internal/external**". If the weighting is set to 100% internal, no external sensor is activated and no communication object appears for the external sensor. With any other setting, an external sensor is activated and the associated object appears. The "mixed" value is sent to the bus via the "Send measured value" object.

**Important:** The external sensor is monitored with a time of 30 minutes. If no new value is received within this time, only the internal sensor is used!
At the same time, an alarm with a "1" is sent to the "External sensor error" object. If an external value is received again, the alarm is reset with a "0".

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 15 | Temperature measurement – Send measured value | 2 Byte | Sending the current measured value |
| 16 | Temperature measurement – External sensor input | 2 Byte | Receiving an external measured value |
| 17 | Temperature measurement – Maximum value exceeded | 1 Bit | Sending a message for upper message value |
| 18 | Temperature measurement – Minimum value fallen below | 1 Bit | Sending a message for lower message value |
| 19 | Temperature measurement – Error external sensor | 1 Bit | Sending an alarm |

**Table 17: Communication objects – Temperature measurement**

### 4.2.3 Relative humidity measurement

The following settings are available:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Send measured value on change | ■ **not active**<br>■ active | Setting whether the measured value should be sent on change. |
| Send measured value on change of | 1 ... 10 %<br>**[1 %]** | Setting at which change the measured value should be sent.<br>**Only visible if "Send measured value on change" is activated.** |
| Send measured value cyclically | **not active**<br>1 min – 60 min | Setting whether and at what interval the measured value is sent cyclically. |
| Messages | ■ **not active**<br>■ active | Activation of the message function. |
| Upper message value | 25 ... 100 %<br>**[70 %]** | Setting range of the upper message value.<br>**Only if "Messages" is activated.** |
| Lower message value | 0 ... 75 %<br>**[30 %]** | Setting range of the lower message value.<br>**Only if "Messages" is activated.** |
| Calibration value for internal sensor | -20 ... 20 %<br>**[0 %]** | Adjustment for internal sensor. |
| Sensor internal/external | ■ **100 % internal**<br>■ 90 % internal/ 10 % external<br>■ 80 % internal/ 20 % external<br>:<br>■ 10 % intern / 90 % external<br>■ 100 % external<br>■ maximum value | Setting of the weighting between internal and external sensor. |

Table 18: Settings – Relative humidity measurement

The setting "**Send measured value on change**" can be used to set the change on which the sensor sends its current value. If set to "not active", the sensor does not send a value, regardless of the size of the change.
The setting "**Send measured value cyclically**" can be used to set the intervals at which the sensor sends its current measured value. The cyclical sending function can be activated or deactivated independently of the setting "Send measured value on change". Measured values are also sent if the sensor has not detected a change. If both parameters are deactivated, a value is never sent.

**Important:** After reset/programming, the first measured value is sent after approx. 1 minute.

With the “**Messages**” function, two message values (upper and lower message value) can be configured. The two functions each have their own communication object.

Principle:
If the upper message value is exceeded, a “1” is sent. If it is undershot again, a “0” is sent.
If the value falls below the lower message value, a “1” is sent. If it is exceeded again, a “0” is sent.

A correction value can be set via the parameter “**Calibration value for internal sensor**”. This is used to increase/decrease the actual measured value. The adjustment range is from -20 to 20 %, i.e. the measured value can be lowered by -20 % and raised to a maximum of 20 %. The sensor sends the corrected measured value when this function is activated.

An external sensor can be activated or deactivated via the weighting “**Sensor internal/external**”. If the weighting is set to 100% internal, no external sensor is activated and no communication object appears for the external sensor. With any other setting, an external sensor is activated and the associated object appears. The “mixed” value is sent to the bus via the “Send measured value” object.
With the “maximum value” setting, the higher of the two measured values (internal/external) is always output.

**Important:** The external sensor is monitored with a time of 30 minutes. If no new value is received within this time, only the internal sensor is used!
At the same time, an alarm with a “1” is sent to the “External sensor error” object. If an external value is received again, the alarm is reset with a “0”.

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 22 | Relative humidity measurement – Send measured value | 2 Byte | Sending the current measured value |
| 23 | Relative humidity measurement – External sensor input | 2 Byte | Receiving an external measured value |
| 24 | Relative humidity measurement – Maximum value exceeded | 1 Bit | Sending a message for upper message value |
| 25 | Relative humidity measurement – Minimum value fallen below | 1 Bit | Sending a message for lower message value |
| 26 | Relative humidity measurement – Error external sensor | 1 Bit | Sending an alarm |

**Table 19: Communication objects – Relative humidity measurement**

## 4.3 Air quality functions

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Air quality traffic light | ■ **not active**<br>■ active | Activation/deactivation of the function. |
| Air quality control | ■ **not active**<br>■ active | Activation/deactivation of the function. |
| Logic function: Comparator 1/2 | ■ **not active**<br>■ active | Activation/deactivation of the function. |

**Table 20: Settings – Air quality functions**

A separate menu appears for each activated function, which is explained in the following chapters.

### 4.3.1 Air quality traffic light

The following parameters are available for the function:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Activate as | ■ **Step output**<br>■ Scene output<br>■ RGB output<br>■ HSV output | Setting for what the output is to be used as. |
| Traffic light with | ■ **3 levels**<br>■ 4 levels | Setting for how many levels the traffic light should work with. |
| Sensor for<br>Air quality traffic light | ■ **CO2**<br>■ VOC (ppm)<br>■ VOC (IAQ Index) | Setting of the sensor according to which the air quality light operates. |
| Hysteresis in | ■ **percent**<br>■ ppm | Selecting the unit for hysteresis.<br>**With “CO2” and “VOC (ppm)” setting.** |
| Hysteresis in | ■ percent<br>■ **IAQ** | Selecting the unit for hysteresis.<br>**With „VOC (IAQ Index)“ setting.** |
| Hysteresis | 0 ... 20 %<br>**[5 %]** | With “Hysteresis in“ → „percent“. |
| | 10 ... 500 ppm<br>**[100 ppm]** | With “Hysteresis in“ → „ppm“. |
| | 0 ... 50<br>**[5]** | With “Hysteresis in“ → „IAQ“ |

| ETS Text | Dynamic range<br>**[Default value]** | | | | Comment |
|---|---|---|---|---|---|
| | 0 ... 2000 ppm | | 0 ... 500 | | Setting range of the threshold values at which switching is to take place.<br>(left column: ppm; right column: IAQ))<br>■ **Unit depending on setting "Sensor for air quality traffic light".**<br>■ **Threshold value 3 only available with setting "4 levels".** |
| Threshold value 1<br>(level 1 -> level 2) | **[800]** | **[800]** | **[100]** | **[100]** | |
| Threshold value 2<br>(level 2 -> level 3) | **[1200]** | **[1500]** | **[250]** | **[250]** | |
| Threshold value 3<br>(level 3 -> level 4) | **[1700]** | | **[400]** | | |
| Colour value for<br>level 1<br>level 2<br>level 3<br>level 4 | A colour field is displayed for each level in which the individual colour for the level can be set. | | | | Setting the colours for the different levels.<br>■ **Only with "RGB or HSV output".**<br>■ **level 4 only with setting „4 levels".** |
| Scene number for<br>level 1<br>level 2<br>level 3<br>level 4 | 1 – 64<br>**[1]**<br>**[2]**<br>**[3]**<br>**[4]** | | | | Setting the scene numbers for the different levels.<br>■ **Only with "Scene output".**<br>■ **level 4 only with setting „4 levels".** |
| Sending condition of output | ■ **not active**<br>■ on change<br>■ cyclic<br>■ cyclic and on change | | | | Setting whether and when the output object is to be sent. |
| Send cyclically every... | 1 min – 60 min<br>**[60 min]** | | | | Setting at which interval the measured value is sent cyclically.<br>**Only if "cyclic..." is active.** |

**Table 21: Settings – Air quality traffic light**

The "**Air quality traffic light**" parameter determines how the function is implemented.

If "**Step output**" is selected, the different levels are sent via 1-bit objects.

If "**Scene output**" is selected, a scene can be sent for the respective traffic light level.

If "**RGB output**" or "HSV output" is selected, a 3-byte colour value is sent for the respective traffic light level.

The reference sensor for the traffic light control is set via "**Sensor for air quality traffic light**".

The "Hysteresis" setting adjusts the switching frequency between the thresholds. Depending on the selected sensor, the unit of the hysteresis can be set in percent, ppm or IAQ.

The "**threshold values**" for switching between the levels can be freely determined. The unit for the values corresponds to the selected sensor.

With the "**Sending condition of output**" it can be set whether and how the output value is to be sent. If "cyclic..." is selected, the transmission interval can also be set.

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 29 | Air quality traffic light – Output level 1 | 1 Bit | Switching of output level 1 |
| 30 | Air quality traffic light – Output level 2 | 1 Bit | Switching of output level 2 |
| 31 | Air quality traffic light – Output level 3 | 1 Bit | Switching of output level 3 |
| 32 | Air quality traffic light – Output level 4 | 1 Bit | Switching of output level 4 |
| 33 | Air quality traffic light – Output RGB | 3 Byte | Sending a RGB colour value |
| 33 | Air quality traffic light – Output HSV | 3 Byte | Sending a HSV colour value |
| 34 | Air quality traffic light – Output Scene | 1 Byte | Sending a scene number |

Table 22: Communication objects – Air quality traffic light

## 4.3.2 Air quality control

The menu item “Air quality control” is divided into individual chapters for better understanding. Some parameters are generally valid for all controllers. This is followed by the chapters with the specific settings of the individual controller types. Finally, there are more generally valid points.

At the beginning, a controller is activated that is to be configured subsequently.
The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Activate as | ■ **Step controller Bit coded**<br>■ Step controller binary coded<br>■ Step controller as Byte<br>■ PI controller | Activation/deactivation of the function. |

Table 23: Settings – Activation of air quality controller

The controllers differ in the type of output (Bit or Byte objects). With the PI controller, the proportional component and integral component of the control can also be configured individually.

### 4.3.2.1 Generally valid parameters

The parameters described here are available and valid for every controller type.
The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Day/Night switchover | ■ not active<br>■ **active** | Activation/deactivation of a "Day/Night" object. |
| Value for Day/Night | ■ **Day = 1 / Night = 0**<br>■ Day = 0 / Night = 1 | Sets the polarity for the Day/Night object. |
| Day/Night object after bus power return | ■ no request<br>■ **request** | Setting whether the object is to be automatically requested when the bus voltage returns. |
| Controller: Actual value | ■ **CO2**<br>■ VOC (ppm)<br>■ VOC (IAQ Index)<br>■ CO2 + Humidity<br>■ VOC (ppm) + Humidity<br>■ VOC (IAQ Index) + Humidity | Setting, which sensors the controller uses as a basis for control. |
| Number of external Room sensors | **not active**<br>1 ... 10 | Activation of additional sensors.<br>**When selecting one sensor in "Controller: Actual value".** |
| Number of external Room sensors | **not active**<br>1 + 1, 2 + 2 ... 5 +5 | Activation of additional sensors.<br>**When selecting two sensors in "Controller: Actual value".** |
| Send control value/output cyclically | **not active**<br>1 min – 60 min | Setting whether and in which cycle the output or the control value respectively should be sent to the bus. |
| Air quality control with humidity increase by... | **not active**<br>1 level ... 4 levels<br><br>**not active**<br>25%, 50%, 75%, 100% | Setting whether increased humidity affects the control.<br>■ **Displayed if "+ Humidity" is active for "Controller actual value".**<br>■ **Selection (levels/%) depending on the controller type (PI or step controller).** |
| Threshold for exceeding the air humidity | 0 – 100%<br>**[75%]** | Setting from which increase in humidity the control reacts to it. |
| Follow-up time after falling below | 1 – 60 min<br>**[30 min]** | Setting of the time from when the controller switches back to the previous control after the value falls below the threshold. |

**Table 24: Settings – Air quality controller: General parameters**

**Day/Night switchover**
**Important:** Independent of the “Day/Night” object in the “General settings” menu, there is a separate “Day/Night” object for the air quality control. The two objects do not influence each other!

After activation, the polarity can be set via “**Value for Day/Night**”.
Regardless of this polarity, the device always starts in “Day” mode after reprogramming.
You can also specify whether the Day/Night object should be **actively requested after a bus power return**.

**Controller: Actual value**
Here you set which variable(s) the controller uses as a basis for control. This can be only one sensor (CO2 or VOC) or two sensors (CO2 respectively VOC + humidity).

**Number of external Room sensors**
The parameter makes it possible to integrate further sensors into the control in addition to the respective integrated sensor. This can be important if, for example, a central ventilation control contains several rooms. Each room has its own sensor and all sensors are included in the calculation.

If only one sensor is selected for the “Controller actual value”, up to 10 external room sensors can be set. If two sensors are selected (CO2 + humidity, VOC + humidity), 5 external sensors of both types can be activated. The highest measured value is decisive for the level to be switched or the control value to be sent.

Example:
Controller actual value: “CO2 + humidity”, External room sensors: “5 + 5”.
5 external CO2 sensors and 5 external humidity sensors can be included.
Special feature: If 5 CO2 sensors but only 3 humidity sensors are used with this setting, the unused sensors are preset with the value “0” and do not influence the control.

**Air quality control with humidity increase by...**
The parameter is only displayed if a selection is made with “+ Humidity” as “Controller actual value”. Here you can set by which level (“ Step controller”) or by which control value (PI controller) the air quality control is to be raised as soon as a certain threshold value for the air humidity is exceeded. This value is determined with the setting “**Threshold for exceeding the humidity**”.
The “**Follow-up time after falling below**” defines the minimum time by which the threshold value must be fallen below to return to the current control.

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 39 | Air quality controller – CO2 Input 1, VOC Input 1 | 2 Byte | Input of an external measured value. |
| 40 | Air quality controller – CO2 Input 2, VOC Input 2 | 2 Byte | Input of an external measured value. |
| 41 | Air quality controller – CO2 Input 3, VOC Input 3 | 2 Byte | Input of an external measured value. |
| 42 | Air quality controller – CO2 Input 4, VOC Input 4 | 2 Byte | Input of an external measured value. |
| 43 | Air quality controller – CO2 Input 5, VOC Input 5 | 2 Byte | Input of an external measured value. |
| 44 | Air quality controller – CO2 Input 6, VOC Input 6, Humidity Input 1 | 2 Byte | Input of an external measured value. |
| 45 | Air quality controller – CO2 Input 7, VOC Input 7, Humidity Input 2 | 2 Byte | Input of an external measured value. |
| 46 | Air quality controller – CO2 Input 8, VOC Input 8, Humidity Input 3 | 2 Byte | Input of an external measured value. |
| 47 | Air quality controller – CO2 Input 9, VOC Input 9, Humidity Input 4 | 2 Byte | Input of an external measured value. |
| 48 | Air quality controller – CO2 Input 10, VOC Input 10, Humidity Input 5 | 2 Byte | Input of an external measured value. |
| 258 | Day/Night - Air quality controller – Day = 1 / Night = 0, Night = 1 / Day = 0 | 1 Bit | Input of a value, whether “Day” or “Night” |

**Table 25: Communication objects – Air quality controller**

### 4.3.2.2 Specific settings – Step controller Bit coded

The following table shows the available settings:

| ETS Text | Dynamic range [Default value] | | Comment |
|---|---|---|---|
| Minimum level for „Day“ | Level 0 – Level 4 **[Level 0]** | | Defines the minimum or maximum level to be switched in “Day” or “Night” mode. |
| Maximum level for „Day“ | Level 0 – Level 4 **[Level 4]** | | |
| Minimum level for „Night“ | Level 0 – Level 4 **[Level 0]** | | |
| Maximum level for „Night“ | Level 0 – Level 4 **[Level 4]** | | |
| Threshold level 1<br>Threshold level 2<br>Threshold level 3<br>Threshold level 4 | 400 ... 2000 ppm<br>**[600]**<br>**[800]**<br>**[1000]**<br>**[1200]** | 50 ... 500<br>**[80]**<br>**[160]**<br>**[240]**<br>**[320]** | Setting range of the threshold values at which switching is to take place.<br>**Unit (ppm/IAQ) depending on the selection in “Controller actual value”.** |
| Hysteresis in | ■ **percent**<br>■ ppm | | Selecting the unit for hysteresis.<br>**With “CO2” and “VOC (ppm)” setting“.** |
| Hysteresis in | ■ percent<br>■ **IAQ** | | Selecting the unit for hysteresis.<br>**With „VOC (IAQ Index)“ setting.** |
| Hysteresis | 0 ... 20 %<br>**[5 %]** | | With “Hysteresis in“ → „percent“. |
| | 10 ... 500 ppm<br>**[100 ppm]** | | With “Hysteresis in“ → „ppm“. |
| | 0 ... 50<br>**[5]** | | With “Hysteresis in“ → „IAQ“ |

Table 26: Settings – Step controller Bit coded

**Minimum/Maximum level for „Day“/“Night“**
With these settings, the air quality control can be limited. A fixed level can be set for the respective parameter, which cannot be exceeded or undercut.

**Note:** If the “Day/Night switchover” is “not active”, the parameters are only called “Minimum level” and “Maximum level” respectively.

**Threshold level 1 – 4**
The threshold values at which the switching between the different levels is to take place are set here.

**Note:** The active level sends a “1”, the other objects are each “0”. At level 0, every output object (levels 1-4) is “0”.

**Hysteresis**
The hysteresis is used to avoid too frequent switching between the different levels.
The parameter "**Hysteresis in**" defines the unit of the hysteresis. The definition depends on the selection in the "Controller: Actual value" parameter.

Example of hysteresis:

Threshold value level 1: 600 ppm. Hysteresis in "percent": "10%".

At 630 ppm the control switches from level 0 to level 1. At 570 ppm the control switches from level 1 back to level 0. If the measured value changes within the two limits, there is no changeover.

The associated communication objects are shown in the table:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 53 | Air quality controller – Output level 1 | 1 Bit | Switching the 1st output level |
| 54 | Air quality controller – Output level 2 | 1 Bit | Switching the 2nd output level |
| 55 | Air quality controller – Output level 3 | 1 Bit | Switching the 3rd output level |
| 56 | Air quality controller – Output level 4 | 1 Bit | Switching the 4th output level |

**Table 27: Communication objects – Step controller Bit coded**

For more information on the parameters that are not described in detail, see the following chapters:

4.3.2.1 Generally valid parameters

4.3.2.6 Behaviour on lock

### 4.3.2.3 Specific settings – Step controller binary coded

The functionality of the binary-coded step controller is identical to that of the “Step controller Bit coded” as described in chapter 4.3.2.2 Specific settings – Step controller Bit coded.
The only difference is that the output level is transmitted in binary code. Object 53 is Bit 0, object 54 is Bit 1 and object 55 is Bit 2.

The following table shows the binary-coded switching of the output stage:

| Normal step controller | Binary value | step controller binary coded |
|---|---|---|
| Level 0 | 000 | Object 53, 54 ,55 = 0 |
| Level 1 | 001 | Object 53 = 1, Objects 54 & 55 = 0 |
| Level 2 | 010 | Object 54 = 1, Objects 53 & 55 = 0 |
| Level 3 | 011 | Objects 53 & 54 = 1, Object 55 = 0 |
| Level 4 | 100 | Object 55 = 1, Objects 53 & 54 = 0 |

**Table 28: Switching principle – Step controller binary coded**

The following table shows the associated communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 53 | Air quality controller – Output Bit 0 | 1 Bit | Sending of Bit 0 |
| 54 | Air quality controller – Output Bit 1 | 1 Bit | Sending of Bit 1 |
| 55 | Air quality controller – Output Bit 2 | 1 Bit | Sending of Bit 2 |

**Table 29: Communication objects – Step controller binary coded**

### 4.3.2.4 Specific settings - Step controller as Byte

The “Step controller as byte” sends a fixed control value in percent for each output level. Four values (level 1-4) can be defined. In addition, there is the state “OFF” (0 %) as level 0. This cannot be set in the parameters and is switched when the value falls below “Threshold level 1”.

The following table shows the specific settings for this controller type:

| ETS Text | Dynamic range<br>**[Default value]** | | Comment |
|---|---|---|---|
| Minimum level for „Day“ | Level 0 – Level 4<br>**[Level 0]** | | Defines the minimum or maximum level to be switched in “Day” or “Night” mode. |
| Maximum level for „Day“ | Level 0 – Level 4<br>**[Level 4]** | | |
| Minimum level for „Night“ | Level 0 – Level 4<br>**[Level 0]** | | |
| Maximum level for „Night“ | Level 0 – Level 4<br>**[Level 4]** | | |
| Threshold level 1<br>Threshold level 2<br>Threshold level 3<br>Threshold level 4 | 400 ... 2000 ppm<br>**[600]**<br>**[800]**<br>**[1000]**<br>**[1200]** | 50 ... 500<br>**[80]**<br>**[160]**<br>**[240]**<br>**[320]** | Setting range of the threshold values at which switching is to take place.<br>**Unit (ppm/IAQ) depending on the selection in “Controller: Actual value”.** |
| Hysteresis in | ■ **percent**<br>■ ppm | | Selecting the unit for hysteresis.<br>**With “CO2” and “VOC (ppm)” setting“.** |
| Hysteresis in | ■ percent<br>■ **IAQ** | | Selecting the unit for hysteresis.<br>**With „VOC (IAQ Index)“ setting.** |
| Hysteresis | 0 ... 20 %<br>**[5 %]** | | With “Hysteresis in“ → „percent“. |
| | 10 ... 500 ppm<br>**[100 ppm]** | | With “Hysteresis in“ → „ppm“. |
| | 0 ... 50<br>**[5]** | | With “Hysteresis in“ → „IAQ“ |
| Control value „Day“<br>(level 1)<br>(level 2)<br>(level 3)<br>(level 4) | 0 – 100%<br>**[25%]**<br>**[50%]**<br>**[75%]**<br>**[100%]** | | Setting which control value is to be sent for the respective level in “Day” mode. |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Control value „Night“<br>(level 1)<br>(level 2)<br>(level 3)<br>(level 4) | 0 – 100%<br>**[10%]**<br>**[30%]**<br>**[50%]**<br>**[70%]** | Setting which control value is to be sent for the respective level in “Night” mode. |

Table 30: Settings – Step controller as Byte

**Minimum/Maximum level for „Day“/“Night“**
With these settings, the air quality control can be limited. A fixed level can be set for the respective parameter, which cannot be exceeded or undercut.

**Note:** If the “Day/Night switchover” is “not active”, the parameters are only called “Minimum level” and “Maximum level” respectively.

**Threshold level 1 – 4**
The threshold values at which the switching between the different levels is to take place are set here.

**Hysteresis**
The hysteresis is used to avoid too frequent switching between the different levels.
The parameter “**Hysteresis in**” defines the unit of the hysteresis. The definition depends on the selection in the “Controller: Actual value” parameter.

Example of hysteresis:

Threshold value level 1: 600 ppm. Hysteresis in “percent”: “10%”.

At 630 ppm the control switches from level 0 to level 1. At 570 ppm the control switches from level 1 back to level 0. If the measured value changes within the two limits, there is no changeover.

**Control value „Day“/“Night“ (level 1 – 4)**
The absolute values of the different levels are defined here. If the “Day/Night” object is activated, different values can be defined for “Day” or “Night” operation. If the “Day/Night” object is not active, the text addition “for Day” or “for Night” is omitted and only one control value can be defined in each case.

The following table shows the associated communication object:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 52 | Air quality controller – Output control value | 1 Byte | Sending the control value |

Table 31: Communication object – Step controller as Byte

For more information on the parameters that are not described in detail, see the following chapters:

4.3.2.1 Generally valid parameters

4.3.2.6 Behaviour on lock

### 4.3.2.5 Specific settings – PI controller

The PI controller, just like the “Step controller as byte”, outputs a continuous control value from 0-100%. In contrast to this, however, the PI controller calculates its value depending on the difference between the set setpoint and the actual value, considering the set control parameters “proportional value” and “reset time”.

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | | Comment |
|---|---|---|---|
| Setpoint valid | ■ **for “Day” (“Night” not active)**<br>■ for “Night” (“Day” not active)<br>■ for “Day” and “Night” | | Setting for which mode the setpoint is valid and thus the control is to be activated.<br>**Only if “Day/Night switchover” is active.** |
| Reset the value set via object “Preset setpoint” to parameter settings at the next Day/Night switchover | ■ not active<br>■ **active** | | Setting whether the “Day/Night changeover” should delete a preset setpoint.<br>**Only if “Day/Night switchover” is active.** |
| Setpoint for „Day“ | 400 ... 2000 ppm<br>**[600]** | 50 ... 500<br>**[80]** | Setting range of the control values at which switching is to take place.<br>**Unit (ppm/IAQ) depends on selection in “Controller: Actual value”.** |
| Setpoint for „Night“ | 400 ... 2000 ppm<br>**[700]** | 50 ... 500<br>**[100]** | |
| Minimum control value for „Day” | 0 – 100%<br>**[0%]** | | Defines the minimum or maximum control value to be sent in “Day” or “Night” mode. |
| Maximum control value for „Day” | 0 – 100%<br>**[100%]** | | |
| Minimum control value for ”Night” | 0 – 100%<br>**[0%]** | | |
| Maximum control value for ”Night” | 0 – 100%<br>**[30%]** | | |
| Proportional value | 400 ... 2000 ppm<br>**[600]** | 10 ... 250<br>**[100]** | Setting of the P-component for the regulation.<br>**Unit (ppm/IAQ) depending on the selection in “Controller: Actual value”** |
| Reset time | **15 min**, 30 min, 45 min ... 210min | | Setting of the I-component for the regulation. |

Table 32: Settings – PI controller

The parameter “**Setpoint valid**” can be used to set when a fixed setpoint is to be valid.

**Important:** This parameter is only available if the “Day/Night switchover” has been activated.

The settings have the following effect:

- **for „Day“ („Night“ not active)**
  With this setting, only one setpoint can be specified for “Day” operation. In “Night” mode, the control is switched off.
- **for „Night“ („Day“ not active)**
  With this setting, only one setpoint can be specified for “Night” operation. In “Day” mode, the control is switched off.
- **for „Day“ and „Night“**
  With this setting, two separate setpoints can be specified for Day and Night operation. In this way, the PI controller controls in “Day” or “Night” mode to the respective set value.

**Reset the value set via object “Preset setpoint” to parameter settings at the next Day/Night switchover**
Via the object “Preset setpoint”, a new setpoint can be specified via visualisation, etc. Activating the parameter has the effect that the manual pre-setting of a new setpoint via this object becomes invalid when switching between “Day” and “Night” operation and the parameter value is reloaded.
In the event of a reset or reprogramming, the configured setpoint always applies.

**Minimum/Maximum control value for „Day“/“Night“**
With this setting, the control value of the air quality control can be limited. If, for example, the fan is only to run at 30% in “Night” mode, to keep the noise level of the ventilation low or to avoid draughts, this can be realised here. Please note that the minimum/maximum values limit the control and thus the actual value may not be completely controlled up to the setpoint.
If the Day/Night object is activated in the “General Settings” menu, different values can be defined for “Day” or “Night” operation.

**Note:** If the “Day/Night” object is not active, the text addition “for Day” or “for Night” is omitted and only a “Minimum Value” and a “Maximum Value” can be defined.

**Proportional value**
The proportional value stands for the P-component of a control. This leads to a proportional increase of the control value to the control difference.
A small proportional band leads to a fast control of the control difference. With a small proportional band, the controller reacts almost immediately and sets the control value almost to the maximum value (100 %) even with small control differences. However, if the proportional band is selected too small, the risk of overshooting is very high.

**Reset time**
The reset time represents the I-component of a control. This leads to an integral approach of the actual value to the setpoint. A short reset time means a strong I component.
A short reset time causes the control value to quickly approach the control value set according to the proportional range. A long reset time, on the other hand, causes a slow approach to this value.

The following figure illustrates the interrelationships of PI control:

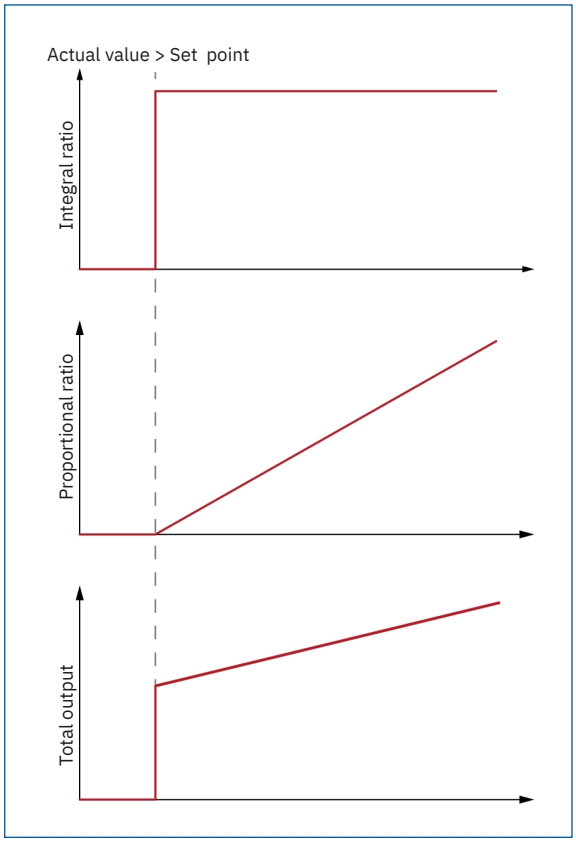


**Figure 4: Diagram – Principle of PI control**

The following communication objects are available for this:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 37 | Air quality control –Preset setpoint | 2 Byte | Receiving a new absolute setpoint |
| 38 | Air quality control –Current setpoint | 2 Byte | Sending the currently valid setpoint |
| 52 | Air quality controller –<br>Output control value | 1 Byte | Sending the control value |

**Table 33: Communication objects – PI controller**

For more information on the parameters that are not described in detail, see the following chapters:

4.3.2.1 Generally valid parameters

4.3.2.6 Behaviour on lock

### 4.3.2.6 Behaviour on lock

This parameter is available for every controller.
The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Behaviour on lock | ■ **not active**<br>■ hold value and send cyclically<br>■ hold value<br>■ send a certain value<br>■ override control via object | Setting for how the controller should behave when a lock is set. |
| Level at lock | Level 0 ... Level 4<br>**[Level 1]** | Level to be sent during a lock.<br>**With setting “send a certain value”, for step controller “Bit coded” and “binary coded”.** |
| Value at lock | 0 ... 100%<br>**[0%]** | Control value to be sent during a lock.<br>**With the setting “send a certain value”, for “step controller as Byte” and “PI controller”.** |

Table 34: Settings – Behaviour on lock

The settings cause the following actions:

- **not active**
  Lock function is deactivated, and no object is displayed.
- **hold value and send cyclically**
  The current level or the current control value is held when the lock is set and does not change as long as the lock is active. This value is sent cyclically.
  **Note:** The time for cyclical sending is set in the next parameter “Send setpoint/output cyclically”.
- **hold value**
  The current level or control value is held when the lock is set and does not change as long as the lock is active.
- **send a certain value**
  The set level or the set value is called up when the lock is activated.
- **override control via object**
  **Important:** A lock must first be set. Afterwards, the control (current level or control value, depending on the type of control) can be “overridden” via object.

  The override of the levels (step controller Bit coded, step controller binary coded) is done via decimal value, where: value 0 = level 0, value 1 = level 1 ... value 4 = level 4.
  The override of the control value (step controller as Byte, PI controller) is done via percentage value.
  After resetting the lock with “0”, the control continues in the currently calculated level or with the calculated control value.

The following table shows the associated communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 51 | Air quality controller – Lock controller | 1 Bit | Locking the output stage |
| 57 | Air quality controller – Override level, override control value | 1 Byte | Receiving a value for override |

**Table 35: Communication objects – Lock behaviour**

### 4.3.3 Logic function: Comparator 1 / 2

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Datapoint type of the comparison | ■ **1 Byte DPT 5.001 Percent (0...100%)**<br>■ 1 Byte DPT 5.005 Decimal factor (0...255)<br>■ 2 Byte DPT 7.xxx IAQ Index<br>■ 2 Byte DPT 9.001 Temperature (°C)<br>■ 2 Byte DPT 9.004 Brightness (Lux)<br>■ 2 Byte DPT 9.007 Humidity (%)<br>■ 2 Byte DPT 9.008 Air quality (ppm) | Selection of the datapoint type with which the comparison works. |
| Output type | ■ **Minimum value**<br>■ Average value<br>■ Maximum value | Definition of the value to be determined and sent. |
| Sending condition | ■ **on change of output**<br>■ on change of output and cyclic<br>■ on input telegram<br>■ on input telegram and cyclic | Setting when and how the output object is to be sent. |
| Send on change of | 1 % – 20 %<br>**[1 %]** | Value of the change at which the output object is sent.<br>**Only for condition "on change of output ...".** |
| Send cyclically every | **not active**<br>10 s – 60 min | Setting whether and at what interval the output object should be sent.<br>**Only with condition „ ... cyclic".** |
| Input 1 - 5 | ■ not active<br>■ active | Activation of the respective input.<br>**Standard values:**<br>**1/2 „active", 3/4/5 „not active".** |
| Monitoring | **not active**<br>1 min – 60 min | Definition of a monitoring interval for the respective input. |
| Behaviour in case of input failure | ■ **remain at last valid output value**<br>■ ignore failed input value<br>■ send a fixed output value | Setting for how to deal with the failure of one of the inputs. |
| Value for emergency operation | Adjustable value;<br>value range depends on the datapoint type of the comparison | Value to be sent at the output.<br>**For "Send a fixed output value".** |
| Lock function | ■ **not active**<br>■ active | Activation of a lock object. |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Polarity | ■ Lock = 1 / Unlock = 0<br>■ Lock = 0 / Unlock = 1 | Setting with which value should be locked/unlocked. |
| Behaviour on lock | ■ **no action**<br>■ send fixed value | Definition of the action to be performed when a lock is set. |
| Value | 0 ... 255<br>**[0]** | Value to be sent when a lock is set.<br>**Only with „send fixed value“.** |
| Behaviour on withdrawal of lock | ■ **send current value**<br>■ no action | Definition of the action to be performed when unlocking. |

**Table 36: Settings – Logic function: Comparator**

This function can be used to compare up to 5 inputs of a datapoint type with each other. You can specify whether the minimum value, the maximum value or an average value should be sent at the output. The behaviour of the output is defined via the sending conditions.

A separate “**Monitoring**” period can be set for each activated **“Input”**. If the object for the corresponding input does not receive a value within this time, “Emergency operation” is triggered.
If at least one “Monitoring” is active, the “Info - Emergency operation” object is displayed. If a monitoring time is exceeded, a “1” is sent via this object. It is important to ensure that it is not defined which input has exceeded the monitoring time. If the inputs are working normally again, a “0” is sent.

The “**Behaviour in case of input failure**” setting can be used to select an action to be carried out in this case:

- **remain at last valid output value:** The last value sent is valid until a new value is received for the corresponding input.
- **ignore failed input value:** The input that has not received a value during the monitoring time is cancelled from the comparison function. Only the remaining inputs are analysed.
- **send a fixed output value**: Depending on the datapoint type of the comparison, a fixed “Value for emergency operation” can be set. This value is sent until the corresponding input is working normally again.

When the “L**ock function”** is activated, a “Logic - Comparator x - Lock” object is displayed.
The “**Behaviour on lock**” and “ **... on withdrawal of lock**” is explained as follows:

- “send fixed value”/”send current value” – sends this value immediately with lock/unlock.
- If “no action” is selected, only the comparison function is locked and no value is sent. When unlocked, the comparator switches to normal operation and only sends according to the set sending condition.

The associated communication objects are shown in the table:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 60 - 64 | Logic - Comparator 1 – Input 1 - 5 | 1 Byte<br>2 Byte | Receive the values for the inputs.<br>DPT according to parameter setting |
| 65 | Logic - Comparator 1 – Output | 1 Byte<br>2 Byte | Sending the output value.<br>DPT according to parameter setting |
| 66 | Logic - Comparator 1 – Lock | 1 Bit | Locking object for the comparator |
| 67 | Logic - Comparator –<br>Info - Emergency operation | 1 Bit | Sending the status of whether emergency operation is active |

**Table 37: Communication objects – Logic function: Comparator**

## 4.4 Temperature controller

The temperature controller is activated via the “Operating mode” parameter.
The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Operating mode | ■ **not active**<br>■ Heating<br>■ Cooling<br>■ Heating and Cooling | The other settings depend on the set control mode. |

Table 38: Settings - Operating mode

If the setting “**not active**” is set for the “**Operating mode**”, the controller is deactivated and there are no further configuration options for the controller. As soon as the controller has been assigned a specific function, “**Heating**”, “**Cooling**” or “**Heating and Cooling**”, depending on the application, further settings can be made, and the “Controller parameters” menu also appears on the left-hand side.

The task of the control system is to adjust the actual temperature as close as possible to the specified setpoint. To realize this, several setting options are available to the user. The controller can influence the control value via 3 different control modes (PI control, 2-point control, PWM control). In addition, an additional stage can be assigned to the controller.

In addition, the controller has 4 different operating modes (Frost/Heat protection, Night, Comfort, Stand-by) for differentiated control of various requirement ranges.

Further functions of the controller are the manual setpoint adjustment, the dynamic setpoint adjustment considering the measured outdoor temperature, the setpoint specification via independent setpoints (as absolute values) as well as the operating mode selection after reset and integration of blocking objects.

### 4.4.1 Specific settings – Temperature controller

The individual parameters from the “Temperature controller” menu are described in detail in the following chapters.

#### 4.4.1.1 Setpoints, Operating Modes & Priorities

As a basis, it must be determined in advance how the setpoints are specified:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Setpoints for Standby/ Night | ■ independent setpoints<br>■ depending on setpoint Comfort (Basic) | Setting how the setpoints for the controller are to be specified. |

Table 39: Settings – Setpoints for Standby/Night

The two options are described in detail in the next two chapters.

#### 4.4.1.1.1 Depending on setpoint Comfort (Basic)

With the setting “depending on setpoint Comfort (Basic)””, the operating modes “Standby” and “Night” are always relative to the “setpoint Comfort (Basic)”. If this changes due to a setpoint specification, the values for “Standby” and “Night” also change. Therefore, the values for decrease and increase are given as a temperature difference in “K” (Kelvin). “Frost/Heat protection” does not change here and always remains at the configured value.

The following table shows the individual operating modes and their setting ranges:

| ETS Text | Dynamic range **[Default value]** | Comment |
|---|---|---|
| Setpoint Comfort (Basic) | 7 ... 35 °C **[21 °C]** | **The basic Comfort value is the reference point of the control.** |
| Standby reduction/ increase | 0 K – 10,0 K **[2,0 K]** | Reduction (for "Heating") or increase (for "Cooling") of the temperature when the operating mode “Standby” is selected. Is indicated relative to the basic comfort value. |
| Night reduction/increase | 0 K – 10,0 K **[3,0 K]** | Reduction (for " Heating") or increase (for "Cooling") of the temperature when the “Night” operating mode is selected. Is indicated relative to the basic comfort value. |
| Setpoint Frost protection | 3 ... 12 °C **[7 °C]** | Adjustment of the setpoint for the “Frost protection” mode. **Visible when “Heating” is active.** |
| Setpoint Heat protection | 24 ... 40 °C **[35 °C]** | Adjustment of the setpoint for the “Heat protection” mode. **Visible when “Cooling” is active.** |
| Dead zone between Heating and Cooling | 1 K – 10,0 K **[2,0 K]** | Setting range for the dead zone. **Only visible with “Heating and Cooling”.** |

Table 40: Settings – Operating modes and Setpoints (Depending on setpoint Comfort (Basic))

A new setpoint is specified via object “Preset (Basic) Comfort setpoint”.

In addition, there is a general object for the setpoint specification, the object “Preset setpoint”.

If a value is sent via this, it also changes the basic Comfort value. The special feature is that a setpoint setting automatically switches to the “Comfort” operating mode. This applies to a setpoint in “Standby” or “Night” mode.

**Important: A setpoint setting is ignored in the “Frost-” or “Heat protection” operating mode!**

Background: Some visualisations send fixed values in “Comfort” and need this value to be reported back. This is only possible for the controller if it is also in “Comfort” mode.

### Comfort mode

"Comfort" mode is the controller's reference mode. The values in the "Night" and "Standby" operating modes are based on this. The "Comfort" operation mode should be activated when the room is used. The basic comfort value is configured as the setpoint.
If the controller mode is set to "Heating and Cooling", the basic Comfort value applies for the heating process. In "Cooling" mode, the value of the dead zone between "Heating" and "Cooling" is added.

The communication object for this operating mode is shown in the following table:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 95 | Temperature controller – Comfort mode | 1 Bit | Activating the Comfort operating mode. |

Table 41: Communication object – Comfort mode

### Night mode

The "Night" operating mode should cause a significant temperature reduction/increase, e.g. at night or on weekends. The value can be freely configured and refers to the basic comfort value. So, if a 5 K reduction has been configured and a basic Comfort value of 21 °C has been set, the setpoint for "Night" operation mode is 16 °C. In "Cooling" mode, there is a respective increase in the value.

The communication object for this operation mode is shown in the following table:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 96 | Temperature controller – Night mode | 1 Bit | Activating the Night operating mode. |

Table 42: Communication object – Night mode

### Standby mode

The "Standby" mode is used when nobody is using the room. It should cause a slight reduction/increase in the temperature. This value should be set considerably lower than that of the "Night" operating mode to enable the room to heat up/cool down more quickly.
The value is freely configurable and refers to the basic Comfort value. So, if a setback of 2 K has been configured and a basic Comfort value of 21 °C has been set, the setpoint for "Standby" operation mode is 19 °C. In "Cooling" mode there is a corresponding increase in the value.
The "Standby" operating mode is then activated as soon as all other operating modes are deactivated. This operation mode therefore also has no communication object.

### Frost-/Heat protection mode

The "Frost protection" operating mode is activated as soon as the controller has been assigned the "Heating" function. The "Heat protection" operating mode is activated as soon as the controller has been assigned the "Cooling" function. If the controller is assigned the "Heating & Cooling" function, a combined operating mode called "Frost/Heat protection" is activated.
The "Frost/Heat protection" operating mode automatically switches on "Heating" or "Cooling" when the temperature falls below or exceeds the configured temperature. The temperature is set here as an absolute value. If, for example, the temperature must not fall below a certain value during a longer absence, the "Frost protection" mode should be activated.

The following table shows the associated communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 97 | Temperature Controller – Frost protection mode | 1 Bit | Activates the Frost protection mode |
| 97 | Temperature Controller – Heat protection mode | 1 Bit | Activates the Heat protection mode |
| 97 | Temperature Controller – Frost/Heat protection mode | 1 Bit | Activates the Frost/Heat protection mode |

Table 43: Communication objects – Frost/Heat protection

**Dead zone**

If the control mode is set to “Heating and Cooling”, the following parameter is displayed:

| ETS Text | Dynamic range **[Default value]** | Comment |
|---|---|---|
| Dead zone between Heating and Cooling | 1,0 K – 10,0 K **[2,0 K]** | Setting range for the dead zone. |

Table 44: Setting – Dead zone

The settings for the dead zone are only possible if the controller type is set to “Heating and Cooling”. As soon as this setting is made, the dead zone can be configured.

The dead zone is the area in which the controller does not activate either the heating or cooling process. Consequently, the controller does not send any value to the control value in the dead zone and therefore the control value remains switched-off. When setting the dead zone, please note that a low value leads to frequent switching between heating and cooling, whereas a high value leads to a large fluctuation of the actual room temperature.

If the controller is set to “Heating and Cooling”, the basic comfort value always forms the setpoint for the heating process. The setpoint for cooling is calculated by adding the base comfort value and the dead zone. So, if the base comfort value is set to 21 °C and the dead zone to 3 K, the setpoint for the heating process is 21 °C and the setpoint for the cooling process is 24 °C.

The dependent setpoints for “Heating and Cooling”, i.e. those for the “Standby” and “Night” operating modes, can again be configured independently of each other in the controller mode “Heating and Cooling”. The setpoints are then calculated as a function of the basic Comfort value, the setpoint for the “Comfort” operating mode, for the heating and cooling process.

The setpoints for “Heat”- and “Frost protection” are independent of the settings for the dead zone and the other setpoints.

The following diagram shows again the relationship between dead zone and the setpoints for the individual operating modes:

The following settings were selected for this example:

| | |
|---|---|
| Basic comfort value: | 21 °C |
| Dead zone between heating and cooling: | 3 K |
| Increase and reduction Standby: | 2 K |
| Increase and reduction Night: | 4 K |

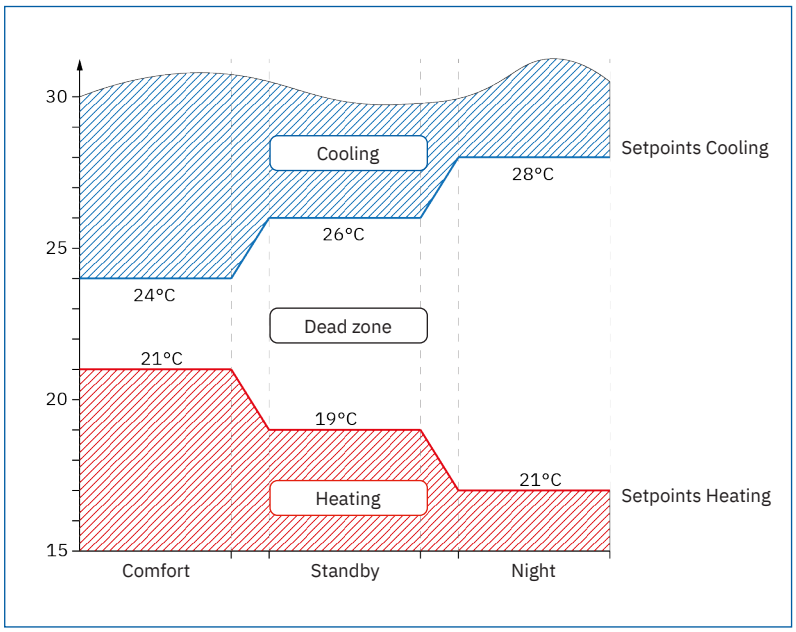


**Figure 5: Diagram – Dead zone and corresponding setpoints**

#### 4.4.1.1.2 Independent setpoints

With the “Independent setpoints” setting it is possible to specify the values for “Comfort”, “Night”, “Standby” and “Frost protection” (when in Heating mode) or “Heat protection” (in Cooling mode) independently of each other as absolute values in “°C”. This means that there is no longer a reference to the Comfort setpoint.

The following table shows the corresponding settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Setpoint Heating/Cooling: Setpoint Comfort (Basic) | 7 ... 35 °C<br>**[21 °C]**<br>**[23 °C]** | Adjustable setpoints for the operating mode described in each case.<br>**Default values for**<br>**[Heating] (top)**<br>**[Cooling] (bottom)** |
| Setpoint Standby | 7 ... 35 °C<br>**[19 °C]**<br>**[24 °C]** | |
| Setpoint Night | 7 ... 35 °C<br>**[18 °C]**<br>**[25 °C]** | |
| Setpoint Frost protection | 3 ... 12 °C<br>**[7 °C]** | Adjustment of the setpoint for the “Frost protection” mode.<br>**Visible when “Heating” is active.** |
| Setpoint Heat protection | 24 ... 40 °C<br>**[35 °C]** | Adjustment of the setpoint for the “Heat protection” mode.<br>**Visible when “Cooling” is active.** |
| Separate objects for setpoints Comfort/ Standby/Night/Frost protection/Heat protection | ■ **not active**<br>■ active, single objects<br>■ active, combined object (DPT 275.100) | Setting of how the setpoint value is to be specified.<br>**Single objects are only possible for the “Heating” or “Cooling” mode!** |

Table 45: Settings – Operating modes and Setpoints (independent setpoints)

**Functional description**

The values for each operating mode are defined by the configuration in the ETS.

Now a new setpoint can be specified for each operating mode without affecting any other operating mode. The setting can be done via single objects (only “Heating” or only “Cooling”) for each operating mode or as 8 Byte combined object (Heating, Cooling, Heating and Cooling).
In addition, there is a general object for the setpoint setting. The setpoint that is currently active is changed via the general communication object “Preset setpoint” (except for Frost/Heat protection!).

Sent values are always reported back in the same way. There is no longer a difference when switching between “Heating” and “Cooling” (no shift due to dead zone) or reduction/increase between the operating modes.

Description of the operating modes, see 4.4.1.1.1 Depending on setpoint Comfort (Basic).

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 78 | Temperature controller – Preset setpoint | 2 Byte | General object for setpoint setting |
| 79 | Temperature controller – Preset Comfort setpoint | 2 Byte | Setpoint setting in Comfort mode |
| 79 | Temperature controller – Preset (Basic) Comfort setpoint | 2 Byte | Setpoint setting in Comfort mode |
| 79 | Temperature controller – Combined object: Preset setpoint | 8 Byte | Setpoint setting via combined object **Visible when “Heating” or “Cooling”** |
| 79 | Temperature controller – Combined object (Heating): Preset setpoint | 8 Byte | Setpoint setting via combined object. **Visible when “Heating and Cooling”** |
| 80 | Temperature controller – Preset Standby setpoint | 2 Byte | Setpoint setting in Standby Mode |
| 81 | Temperature controller – Preset Night setpoint | 2 Byte | Setpoint setting in Night Mode |
| 82 | Temperature controller – Preset Frost protection setpoint | 2 Byte | Setpoint setting in Frost protection mode. |
| 82 | Temperature controller – Preset Heat protection setpoint | 2 Byte | Setpoint setting in Heat protection mode |
| 83 | Temperature controller – Combined object (Cooling): Preset setpoint | 8 Byte | Setpoint setting via combined object. **Visible when “Heating and Cooling”** |

**Table 46: Communication objects – Setpoint setting (independent setpoints)**

#### 4.4.1.1.3 Priority of the operating modes

The following table shows the possible settings for this parameter:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Priority | ■ **Frost(Heat) protection/Comfort/Night/Standby**<br>■ Frost(Heat) protection/Night/Comfort/Standby | Setting the priority order of the operating modes. |

Table 47: Setting – Priority of the operating modes

The priority setting of the operating modes can be used to determine which operating mode is switched on with priority if several operating modes are selected. If, for example, “Comfort” and “Night” are switched on at the same time in the “Frost/Comfort/Night/Standby” priority, the controller remains in “Comfort” mode until it is switched off. Then the controller automatically switches to “Night” mode.

### 4.4.1.2 Operating mode switchover (Mode selection)

There are 2 possibilities for operating mode switchover: On the one hand, the operating mode can be controlled via the associated 1 Bit communications objects and on the other hand, the operating mode can be controlled via a 1 Byte object.
The selection of operating modes via 1 Bit is done by direct control of the individual communication object. Considering the set priority, the operating mode controlled via its communication object is switched on or off. To switch the controller from an operation mode with higher priority to one with lower priority, the previous operation mode first must be deactivated with a logical “0”. If all operation modes are switched off, the controller switches to “Standby” mode.

**Example (set priority: Frost/Comfort/Night/Standby):**

| Operating mode | | | Set operating mode |
|---|---|---|---|
| Comfort | Night | Frost/Heat protection | |
| 1 | 0 | 0 | Comfort |
| 0 | 1 | 0 | Night |
| 0 | 0 | 1 | Frost/Heat protection |
| 0 | 0 | 0 | Standby |
| 1 | 0 | 1 | Frost/Heat protection |
| 1 | 1 | 0 | Comfort |

Table 48: Mode selection via 1 Bit

The mode selection via 1 Byte is done via only one object, the DPT HVAC Mode 20.102 according to the KNX specification. For mode selection, a hex value is sent to the “ mode selection” object. The object evaluates the received hex value and thus switches the associated operating mode on and the previously active operating mode off. If all operating modes are switched off (hex value = 0), the “Standby” operating mode is switched on.

The hex values for the individual operating modes can be taken from the following table:

| Mode selection (HVAC Mode) | Hex-Value |
|---|---|
| Comfort | 0x01 |
| Standby | 0x02 |
| Night | 0x03 |
| Frost/Heat protection | 0x04 |

Table 49: Operating modes – Hex values

The following example illustrates how the controller processes received hex values and thus switches operating modes on or off. The table is based on each other from top to bottom.

**Example (set priority: Frost/Comfort/Night/Standby):**

| Received Hex value | Processing | Set operating mode |
|---|---|---|
| 0x01 | Comfort = 1 | Comfort |
| 0x03 | Comfort = 0; Night = 1 | Night |
| 0x02 | Night = 0; Standby = 1 | Standby |
| 0x04 | Standby = 0; Frost/Heat protection = 1 | Frost/Heat protection |

Table 50: Mode selection via 1 Byte

The controller always reacts to the last value sent. If, for example, an operating mode was last selected via a 1 Bit command, the controller reacts to the switchover via 1 Bit. If a hex value was last sent via the 1 Byte object, the controller reacts to the switchover via 1 Byte.

**Important: There is no priority between switching via 1 Bit and 1 Byte!**

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 93 | Temperature controller – Mode selection | 1 Byte | Selection of operating modes |
| 95 | Temperature controller – Comfort mode | 1 Bit | Activating the Comfort mode |
| 96 | Temperature controller – Night mode | 1 Bit | Activating the Night mode |
| 97 | Temperature controller – Frost/Heat protection mode | 1 Bit | Activating the Frost/Heat protection mode |

Table 51: Communication objects – Mode selection

### 4.4.1.3 HVAC Status objects

There are several options for visualizing the operating modes.
The following table shows all available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| HVAC Status object | ■ HVAC Status (non-standard DPT)<br>■ **HVAC Mode (DPT 20.102)** | Specify whether the status is to be output as HVAC Status or HVAC Mode. |
| Additional HVAC Status object | ■ **not active**<br>■ HVAC Status (non-standard DPT)<br>■ HVAC Mode (DPT 20.102)<br>■ RHCC Status (DPT 22.101)<br>■ RTC combined Status (DPT 22.103)<br>■ RTSM combined Status (DPT 22.107) | Setting an additional HVAC status object. |
| Send HVAC Status object cyclically | **not active**<br>5 min – 4 h | Setting whether and at what intervals the object is to be sent cyclically. |

Table 52: Settings – HVAC status objects

The **HVAC Status (non-standard DPT)** according to the KNX specification sends the corresponding hex value for the currently set operating mode. If several statements apply, the hex values are added, and the status symbol then outputs the added hex value. The hex values can then be read out by a visualization.
The following table shows the hex values associated with the individual messages:

| Bit | DPT HVAC Status | | Hex value |
|---|---|---|---|
| 0 | Comfort | 1=Comfort | 0x01 |
| 1 | Standby | 1=Standby | 0x02 |
| 2 | Night | 1=Night | 0x04 |
| 3 | Frost/Heat protection | 1= Frost/Heat protection | 0x08 |
| 4 | | | |
| 5 | Heating/Cooling | 0=Cooling/1=Heating | 0x20 |
| 6 | | | |
| 7 | Frost alarm | 1=Frost alarm | 0x80 |

Table 53: Assignment – DPT HVAC Status

The object is used exclusively for status/diagnostic purposes. Furthermore, it is well suited for visualization purposes. To visualize the object, it is easiest to evaluate the object bit by bit.
The object outputs the following values, for example:
0x21 = Controller in Heating mode with Comfort mode activated
0x01 = Controller in Cooling mode with Comfort mode activated
0x24 = Controller in Heating mode with Night mode activated

The **RHCC Status (DPT 22.101)** is an additional 2byte status object. It contains additional status messages. Here again, as with the HVAC object, the hex values are added for several messages and the added value is output.

The following table shows the hex values associated with the individual messages:

| Bit | DPT RHCC Status | | Hex value |
|---|---|---|---|
| 0 | Error measuring sensor | 1=Error | 0x01 |
| 7 | Heating/Cooling | 0=Cooling/1=Heating | 0x80 |
| 13 | Frost alarm | 1=Frost alarm | 0x2000 |
| 14 | Heat alarm | 1=Heat alarm | 0x4000 |

Table 54: Assignment – DPT RHCC Status

With the RHCC Status, various error messages or basic settings can therefore be displayed or requested.

**RTC combined status (DPT 22.103)**

This is a combined status according to DPT 22.103.

The assignment is as follows:

| Bit | Beschreibung / Description | Codierung / Encoding |
|---|---|---|
| 0 | Allgemeiner Fehler<br>General failure information | 0 = kein Fehler/no failure<br>1 = Fehler/failure |
| 1 | Aktiver Mode<br>Active mode | 0 = Kühlen/Cool mode<br>1 = Heizen/Heat mode |
| 2 | Taupunkt Status<br>Dew point status | 0 = kein Alarm/no alarm<br>1 = Alarm (RTC gesperrt)/alarm (RTC locked) |
| 3 | Frost Alarm<br>Frost Alarm | 0 = kein Alarm/no alarm<br>1 = Alarm/alarm |
| 4 | Hitze Alarm<br>Overheat-Alarm | 0 = kein Alarm/no alarm<br>1 = Alarm/alarm |
| | | |
| 6 | Zusätzliche Heiz-/Kühlstufe (2. Stufe)<br>Additional heating/cooling stage (2. Stage) | 0 = Inaktiv/inactive<br>1 = Aktiv/active |
| 7 | Heizmodus aktiviert<br>Heating mode enabled | 0 = Falsch/false<br>1 = Wahr/true |
| 8 | Kühlmodus aktiviert<br>Cooling mode enabled | 0 = Falsch/false<br>1 = Wahr/true |

Table 55: Assignment – RTC combined status DPT 22.103

**RTSM combined status (DPT 22.107)**

This is a combined status according to DPT 22.107. The assignment is as follows:

| Bit | Beschreibung / Description | Codierung / Encoding |
|---|---|---|
| 0 | Effektiver Wert des Fensterstatus<br>Effective value of the window status | 0 = alle Fenster geschlossen/<br>all windows closed<br>1 = mindestens ein Fenster geöffnet/<br>at least one window opened |
| 1 | Effektiver Wert des Präsenzstatus<br>Effective value of the presence status | 0 = keine Meldung einer Präsenz/<br>no occupancy from presence detectors<br>1 = mindestens ein Melder belegt/<br>occupancy at least from one presence detector |
| 3 | Status der Komfortverlängerung<br>Status of comfort prolongation User | 0 = Komfortverlängerung not active/<br>comfort prolongation User not active<br>1 = Komfortverlängerung aktiv/<br>comfort prolongation User active |

Table 56: Assignment – RTSM combined status DPT 22.103

## 4.4.1.4 Operating mode after reset

The following table shows all available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Operating mode after reset | ■ **Comfort with configured setpoint**<br>■ Standby with configured setpoint<br>■ Hold previous state and setpoint | Setting which operating mode or behaviour is to be activated after a bus voltage return. |
| Operating mode after reprogramming | ■ **Comfort**<br>■ Standby | Setting the operating mode after reprogramming.<br>**Only with the setting "Hold previous state and setpoint"..** |

Table 57: Settings – Operating mode after reset

- **Comfort with configured setpoint**
  After a bus voltage return, the comfort is activated with the setpoint that was specified by the ETS.
- **Standby with configured setpoint**
  After a bus voltage return, the Standby mode is activated with the setpoint that was specified by the ETS (Comfort setpoint minus Standby reduction).
- **Hold previous state and setpoint**
  The temperature controller recalls the setpoint and mode that was set before the bus was switched off. With this selection, the parameter "**Operating mode after reprogramming**" can be used to additionally set which operating mode is active after reprogramming.

### 4.4.1.5 Setpoint shift

The following table shows all available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Maximum setpoint shift | 0 ... 10 K<br>**[3 K]** | Setting the maximum setpoint shift. |
| Setpoint shift via 1Bit/1Byte object | ■ **not active**<br>■ 1 Bit<br>■ 1 Byte | Setting whether setpoint shift is to be activated via 1 bit or 1 byte. |
| Step width | 0,1 K ... 1 K<br>**[0,5 K]** | Setting of the step width for the setpoint shift via 1 Bit/1 Byte.<br>**Only visible if**<br>**“Setpoint shift via 1 Bit/1 Byte” is active.** |
| Status setpoint shift | ■ **not active**<br>■ active | Activation of an object to send the current state of the setpoint shift. |
| Setpoint shift applies to | ■ **Comfort**<br>■ Comfort/Night/Standby | Validity range of the setpoint shift. |
| Action if shift during Night/Standby | ■ **no action**<br>■ change to Comfort | Setting whether to switch back to comfort after a shift during Night/Standby.<br>**Only if „Setpoint shift applies to“ → „Comfort“ is active.** |
| Delete setpoint shift after change of operating mode | ■ **not active**<br>■ active | Setting whether the current setpoint shift is to be deleted after a change of operating mode or not. |
| Delete setpoint shift after new basic setpoint | ■ not active<br>■ **active** | Setting whether the current setpoint shift should be deleted or not after a new absolute setpoint has been specified.<br>**Only with “independent setpoints”** . |
| Delete setpoint shift after new basic setpoint | ■ not active<br>■ **active** | Setting whether the current setpoint shift should be deleted or not after a new basic setpoint has been specified<br>**Only with “depending on setpoint Comfort (Basic)” .** |
| Reset basic setpoint to configured value after operation mode change | ■ not active<br>■ **active** | Setting whether the base setpoint should be reset to the configured basic setpoint after an operating mode change.<br>**Only with “depending on setpoint Comfort (Basic)”.** |
| Send setpoint change | ■ not active<br>■ **active** | Setting whether a change of the setpoint value should be sent. |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Send current setpoint cyclically | **not active**<br>5 min – 4 h | Setting whether and at what intervals the object is to be sent cyclically. |

Table 58: Settings – Setpoint shift

**Setpoint shift**

The basic comfort setpoint is permanently configured via the ETS. This setpoint can be changed in two ways. On the one hand, a new absolute setpoint can be specified for the controller - this is done via the communication object "(Basic) Comfort setpoint" as a 2 Byte absolute value. On the other hand, the preset setpoint can be raised or lowered manually. This is done via the "manual setpoint shift" objects, optionally via 1 Bit, 1 Byte or 2 Byte.

With the setpoint shift, the currently set setpoint is shifted as a temperature difference. The "manual setpoint shift" object is used for this. With the 1 Byte / 2 Byte objects, a positive Kelvin value is sent to the controller to increase the temperature or a negative Kelvin value to decrease it. With the manual setpoint shift via the 1 Bit object, only on/off commands are sent, and the controller raises the setpoint by the set increment when it receives a "1" and lowers the setpoint by the set increment when it receives a "0".

The setpoint shift over 2 Byte is automatically active for the controller, the corresponding communication object is permanently displayed. The shift via 1 Bit/1 Byte can be activated via parameters.

**Note:** When the setpoint is shifted, the configured basic comfort value is not changed as a reference value for the other operating modes!

The maximum manual shift of the setpoint can be limited via the "**Maximum setpoint shift**" setting. If, for example, the controller is set to a basic comfort value of 21 °C and a maximum setpoint shift of 3 K, the basic comfort value can only be manually shifted within the limits of 18 °C to 24 °C.

Activating the "**Status setpoint shift**" creates a further object. This can be used to send the current status of the setpoint shift. This is important for some visualizations for their correct function.

The "**Setpoint shift applies to**" setting can be used to set whether the shift only applies to the comfort mode or whether the setting should also be adopted for the Night and Standby operating modes. The Frost/Heat protection operating modes are in any case independent of the setpoint shift.

The setting "**Delete setpoint shift after change of operating mode**" can be used to set whether the new setpoint should be retained after a change of operating mode or whether the controller should return to the value configured in the ETS software after a change of operating mode.

"**Delete setpoint shift after new absolute setpoint**" means that the setpoint shift is always deleted as soon as a new setpoint is assigned via object.

"**Delete setpoint shift after new basic setpoint**" value has the effect that after a new basic setpoint value has been specified as an absolute value, the setpoint shift that has taken place is deleted and is started with the new setpoint value.

"**Reset basic setpoint to configuration after change of operating mode**" causes the setpoint to be reset to the configured basic value after each change of operating mode.

If the parameter "**Send setpoint changes**" is activated, the new, now valid setpoint is sent on the bus via the communication object "Current setpoint" with each change.



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When a new absolute Comfort setpoint is read in, a new basic Comfort value is assigned to the controller. There is a significant difference between the settings “dependent on comfort setpoint (basic)” and “independent setpoints”.

**Setting “depending on setpoint Comfort (Basic)”**
This new basic comfort value also automatically causes an adjustment of the dependent setpoints in the other operating modes, as these are relative to the basic Comfort value. All settings for setpoint shifting do not apply here, as a completely new base value is assigned to the controller.
The specification of a setpoint via the communication object “Preset setpoint” offers a special feature. Here the new value is written to the basic Comfort setpoint, a valid setpoint shift is deleted and the controller automatically switches to “Comfort” mode, regardless of which mode the controller was in before. This procedure is required for visualizations that make changes via absolute setpoints. This ensures that the new setpoint sent is also reported back.

**Setting “Independent setpoints”**
Here, an individual absolute value can be specified for each operating mode. If, for example, the setpoint is changed in “Comfort” mode  the other setpoints remain unaffected.
A special feature is the common object “Preset setpoint”. This always changes the setpoint in the currently valid mode. If, for example, the controller is currently in “Standby” mode and the value “20 °C” is sent via this object the “Standby” setpoint is changed to “20 °C” at this moment

The following table shows the associated communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 78 | Temperature controller – Preset setpoint | 2 Byte | Specification of a new absolute setpoint |
| 79 | Temperature controller – Preset (Basic) Comfort setpoint | 2 Byte | Specification of a new absolute setpoint |
| 79 | Temperature controller – Combined object (Heating): Preset setpoint | 8 Byte | Specification of new absolute setpoints via combined object |
| 79 | Temperature controller – Preset Comfort setpoint | 2 Byte | Specification of a new absolute setpoint |
| 80 | Temperature controller – Preset Standby setpoint | 2 Byte | Specification of a new absolute setpoint |
| 81 | Temperature controller – Preset Night setpoint | 2 Byte | Specification of a new absolute setpoint |
| 82 | Temperature controller – Preset Frost protection setpoint | 2 Byte | Specification of a new absolute setpoint |
| 82 | Temperature controller – Preset Heat protection setpoint | 2 Byte | Specification of a new absolute setpoint |
| 83 | Temperature controller – Combined object (Cooling): Preset setpoint | 8 Byte | Specification of new absolute setpoints via combined object |
| 84 | Temperature controller – Send current setpoint | 2 Byte | Sending the current state of the setpoint shift |
| 85 | Temperature controller – Manual setpoint shift (2 Byte) | 2 Byte | Shift of the setpoint relative to the preset Comfort setpoint.<br>Object is permanently displayed |
| 86 | Temperature controller – Manual setpoint shift (1=+ / 0=-) | 1 Bit | Increase/decrease the setpoint relative to the preset Comfort setpoints by the set step width |
| 86 | Temperature controller – Manual setpoint shift (1 Byte) | 1 Byte | Increase/decrease the setpoint relative to the preset Comfort setpoints by the set step width |
| 87 | Temperature controller – Send status setpoint shift | 2 Byte | Sending the current state of the setpoint shift |

**Table 59: Communication objects – Setpoint changes**

### 4.4.1.6 Comfort extension with time

The comfort extension causes a temporary switching to “Comfort” mode.

**Important: The Comfort extension only works for switching from “Night” to “Comfort” mode and back!**

The following table shows the setting options for this parameter:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Comfort extension with time | ■ **not active**<br>■ active | Activation of the Comfort extension via time-dependent object. |
| Comfort extension time | **not active**<br>30 min ... 4 h | Adjustable time for Comfort Extension. |

Table 60: Settings – Comfort extension with time

The comfort extension can be used, for example, to extend the “Comfort” mode for visits, parties, etc. If, for example, a timer switches the channel to “Night” mode at a certain time, it can be switched back to “Comfort” mode for a certain time by means of the Comfort extension. When a “1” is sent to the object “Comfort extension”, the channel switches from “Night” mode back to “Comfort” mode for the set “Comfort extension time”. After the “Comfort extension time” has elapsed, the channel automatically switches back to “Night” mode. If the “Comfort extension” is to be ended before the time has expired, this can be achieved by sending a “0” to the object.
If a “1” is sent to the object again during the Comfort extension, the set time is restarted.
If the mode is changed during the extension, the time is stopped

If the comfort extension is activated, the following communication object appears:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 94 | Temperature controller – Comfort operating mode: Comfort extension | 1 Bit | Temporary switching to Comfort mode via object for the duration of a predefined time |

Table 61: Communication object – Comfort extension with time

### 4.4.1.7 Lock objects

The following table shows all available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Lock object: Control value Heating | ■ **not active**<br>■ active | Activates the lock object for the heating process. |
| Lock object: Control value Cooling | ■ **not active**<br>■ active | Activates the lock object for the cooling process. |

Table 62: Settings – Lock objects for control value

By activating the lock objects, the user has one or two lock objects available for locking the control value, depending on the setting of the controller type. These lock objects serve to prevent the actuators (heating device or cooling device) from starting up undesirably. For example, if the heating is not to start in certain situations, e.g. when the window is open, the lock object can be used to lock the control value. Another application would be manual locking, for example in the event of a cleaning process. The lock object locks the control value as soon as a “1” is sent to the associated communication object. The lock is cancelled with a “0”.

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 106 | Temperature controller –<br>Lock object Heating: Lock control value | 1 Bit | Locks the control value in Heating mode |
| 107 | Temperature controller –<br>Lock object Cooling: Lock control value | 1 Bit | Locks the control value in Cooling mode |

Table 63: Communication objects – Lock objects for control value

### 4.4.1.8 Object for Heating/Cooling request

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Object for Heating request | ■ **not active**<br>■ active | Activates an object to indicate whether a heating request is present or not. |
| Object for Cooling request | ■ **not active**<br>■ active | Activates an object to indicate whether a cooling request is present or not. |

Table 64: Settings –Objects for Heating/Cooling request

The setting “Object for request Heating/Cooling” allows objects to be displayed that indicate an active heating or cooling process. The objects can be used for a visualisation. For example, a red LED could indicate an ongoing heating process and a blue LED could indicate an ongoing cooling process. Another possible application is the central switching on of a heating or cooling process. For example, it can be realised via an additional logic that all heaters of a building/area are switched on as soon as a controller issues the request for heating. The object outputs a “1” as long as the respective process continues. When the process is finished, a “0” is output.

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 112 | Temperature controller – Send Heating request | 1 Bit | Indicates an active/inactive heating process |
| 113 | Temperature controller – Send Cooling request | 1 Bit | Indicates an active/inactive cooling process |

Table 65: Communication objects – Objects for Heating/Cooling request

### 4.4.1.9 Reference via outdoor temperature

**Important: This parameter is only available for the operating mode “Cooling“!**

The following settings are available:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Reference via outdoor temperature | ■ **not active**<br>■ active | Activation of the parameter.<br>**Only available in Cooling mode!** |
| Reference variable minimum | 10 ... 60 °C<br>**[28°C]** | Lower response value of the reference control. |
| Reference variable maximum | 10 ... 60 °C<br>**[38°C]** | Upper response value of the reference control. |
| Setpoint change at maximum reference variable | 1 ... 10 K<br>**[10 K]** | Change of the setpoint when the maximum reference variable is reached. |

**Table 66: Settings – Reference via outdoor temperature**

**General description of the functionality of the “Reference control”:**

The “**Reference control**” parameter makes it possible to linearly track the setpoint as a function of any reference variable, which is recorded via an external sensor. With appropriate configuration, a continuous increase or decrease of the setpoint can be achieved.
To determine the extent to which reference control affects the setpoint, three settings must be made:

- Minimum reference variable ($w_{min}$),
- Maximum reference variable ($w_{max}$)
- Setpoint change at maximum reference variable (△X).

The settings for the reference variable maximum ($w_{max}$) and minimum ($w_{min}$) describe the temperature range in which the reference variable begins and ends to influence the setpoint. The setpoint change at maximum reference variable ($\triangle X_{max}$) describes the ratio of how strongly an increase in the reference temperature affects the setpoint. The actual setpoint change then results from the following relationship:

$$\triangle X = \triangle X_{max} * [(w - w_{min})/(w_{max} - w_{min})]$$

If the reference control is to be increased, a positive value must be set for the “setpoint change at maximum reference variable” (Cooling mode). If, on the other hand, a setpoint reduction is desired, the “setpoint change at maximum command value” must be set to a negative value (Heating mode).
The setpoint change △X is then added to the basic comfort value.

A value above or below the reference value has no effect on the setpoint change. As soon as the value is within the reference variable (i.e. between $w_{max}$ & $w_{min}$ ) ), the setpoint is lowered or raised.

The following graphics are intended to illustrate the influence of the reference variable on the setpoint:
($X_{soll}$ = new setpoint; $X_{basis}$ = base setpoint)

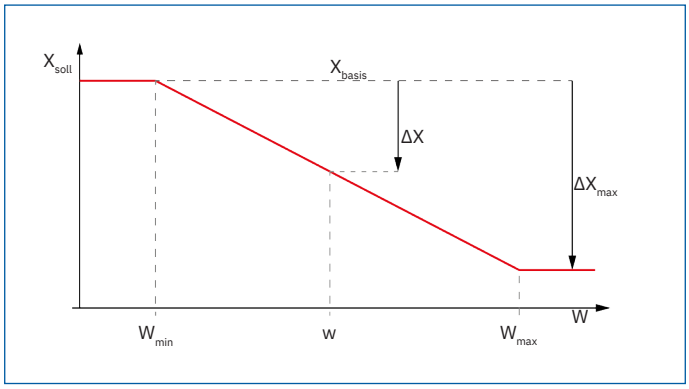


**Figure 6: Diagram – Reference control/decrease**

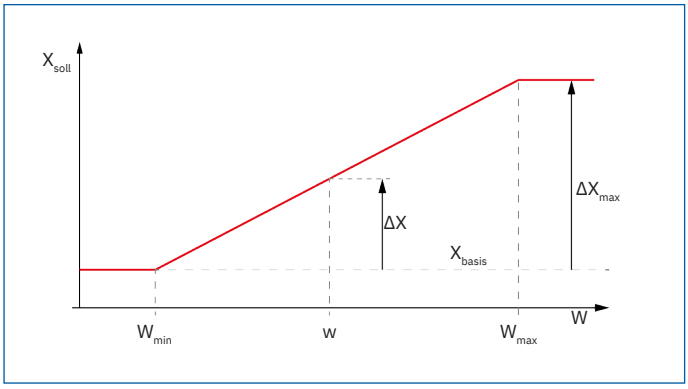


**Figure 7: Diagram – Reference control/increase**

With the communication object of the reference value, the current temperature of the external sensor can be read out. The communication object does not have to be linked with the communication object of the setpoints to activate the command but is only used to request the reference temperature.

**Example of use (guided via outdoor temperature):**
For the temperature control of a room, the setpoint (22 °C) should be raised so that in an outdoor temperature range of 28 °C to 38 °C the temperature difference between outdoor and indoor temperature does not exceed 6 K.

**Settings to be made:**
Basic comfort value: 22°C
Reference control: active
Minimum reference variable: 28 °C
Maximum reference variable: 38°C
Setpoint change at maximum reference variable: 10°C

If the outdoor temperature were to rise to 32°C, the setpoint would be increased by the following value:
△X = 10 °C * [(32 °C - 28 °C)/(38 °C - 28 °C)] = 4 °C
This would result in a new setpoint of 22 °C + 4 °C = 26 °C.
If the outdoor temperature reaches the set maximum value of 38 °C, the setpoint would be 32 °C and would not increase any further if the temperature continues to rise..

The following table shows the corresponding object:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 114 | Outside temperature – Receive measured value/Reference value | 2 Byte | Receiving an external measured value as a reference variable |

Table 67: Communication object – Reference via outdoor temperature

### 4.4.1.10 Flow temperature limitation

**Important: This parameter is only available in the "Heating" mode!**

The following parameter activates the flow temperature limitation:

| ETS Text | Dynamic range **[Default value]** | Comment |
|---|---|---|
| Flow temperature | ■ **not active**<br>■ active | Activation of the flow temperature limitation. |
| Limit flow temperature to | 10 ... 60 °C **[40 °C]** | Setting of the value to which the flow temperature is to be limited. |

Table 68: Settings – Flow temperature limitation

With this setting, the current flow temperature can be limited. This makes it possible to limit the heating temperature as required in certain situations. If, for example, an underfloor heating system is not to heat above a certain value to protect the floor coverings, the heating temperature can be limited by the flow temperature limitation.

The flow temperature limitation requires a second sensor on the flow itself. This sensor measures the current flow temperature. The object that measures the flow temperature is then connected in a group address with the object for the flow temperature of the temperature controller. This then limits the flow temperature according to the set parameters.

The following communication object is available:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 102 | Temperature controller – Receive flow temperature Heating | 2 Byte | Receiving the measured flow temperature |

Table 69: Communication object – Flow temperature limitation

### 4.4.1.11 Alarms

By means of the alarm function, the falling below or exceeding of a set temperature can be indicated via its associated communication objects.

The setting options for this parameter are shown in the table below:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Alarms | ■ **not active**<br>■ active | Activation of the alarms for Frost or Heat |
| Frost alarm if value less | 3 ... 10 °C<br>**[7 °C]** | Setting of the lower indication value.<br>**Only available if "Alarms" →„active".** |
| Heat alarm if value greater | 25 ... 40 °C<br>**[35 °C]** | Setting of the upper indication value.<br>**Only available if "Alarms" →„active".** |

**Table 70: Settings – Alarms**

The alarm function reports the falling below or exceeding of an adjustable temperature via the associated object. Falling below the lower indication value is reported via the Frost alarm object. Exceeding the upper indication value is reported via the heat alarm object. The two signalling objects of size 1 Bit can be used for visualisation or for initiating countermeasures. If the lower indication value is exceeded again or the upper indication value is fallen short of again, a "0" is sent in each case and thus the alarm is cancelled.

The following table shows the two objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 100 | Temperature controller – Send Frost alarm | 1 Bit | Reports falling below the lower indication value |
| 101 | Temperature controller – Send Heat alarm | 1 Bit | Reports the exceeding of the upper indication value |

**Table 71: Communication objects – Alarms**

### 4.4.1.12 Window contact

The setting options for this parameter are shown in the table below:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Window contact | ■ **not active**<br>■ active | Setting whether window contact is monitored or not. |
| State of window | ■ **0=closed / 1=open (standard DPT)**<br>■ 1=closed / 0=open | Setting the polarity with which value the window is open/closed. |
| Delay time | 0 ... 240 s<br>**[5 s]** | Time by which the switchover is delayed after opening/closing. |
| Action when opening the window | force Frost-/Heat protection | Fixed text.<br>Not changeable |
| Action when closing the window | ■ **HVAC Modus before locking**<br>■ HVAC Modus catch up | Definition of the mode that is activated when the window is closed. |
| Release time | not active (not recommended)<br>1 h – 24 h<br>**[12 h]** | Setting after which time the unit automatically switches back to the previous mode. |

Table 72: Settings – Window contact

With this function, the control in a room can be forced into frost or heat protection after opening a window. Normal Heating/Cooling operation is thus interrupted for a long time. This prevents, for example, that energy is unnecessarily consumed for heating after opening a window in winter. After closing the window, it is then possible to switch back to normal operation.

The “**Delay time**” has the effect that the action to be carried out after opening/closing the window only takes place after a configurable time. This means that a short opening of the window can be carried out without influencing the control.

With “**Action when closing the window**” it can be set whether after closing, the window returns to the mode before the lock or in the mode that, for example, was sent during the lock as from a timer or a visualization.

The “**Release time**” defines the time after which the controller automatically returns to the previous operating mode after the window has been opened. This is useful if, for example, you forget to close the window again. In this case, the room would be prevented from cooling down in winter or overheating in summer.

The following table shows the associated communication object:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 105 | Temperature controller – Window contact:<br>0=closed / 1=open<br>1=closed / 0=open | 1 Bit | Receiving the current window status.<br>Polarity depending on setting. |

Table 73: Communication object – Window contact

### 4.4.1.13 Diagnosis

The diagnosis function outputs the status of the controller in “plain text” and is used to quickly read out the current device status.

The **communication object “Diagnosis status”** is used for the output. This is permanently displayed and sends automatically with every change.

The following messages can be sent out by the diagnosis function:

| | Byte 0-1 | Byte 3 | Byte 5-11 | Byte 13 |
|---|---|---|---|---|
| **Info** | | Heating/Cooling | Operation mode | Control value > 0%, if „yes“: Value 1 |
| | | | | |
| **Possible messages** | | Heating: H | Comfort | Control value = 0%: 0 |
| | | Cooling: C | Standby | Control value > 0%: 1 |
| | | | Night | |
| | | | Frost | |
| | | | Heat | |
| | | | ComProl – Comfort prolonga-tion active | |
| | | | Window - Window contact active | |
| | | | BIT – Channel operating mode switching 1 Bit | |
| | | | PWM BYTE – Channel operating mode continuous 1 Byte | |
| | | | | |
| **Special messages** | Locked | Channel is locked | | |
| | Contr Flowtemp | Control value reduced by flow temperature | | |
| | Contr Dewpoint | Control value reduced by dew point | | |
| | Setpoint Guide | Control value reduced by outdoor temperature/reference variable | | |
| | Dew point alarm | The dew point alarm is active | | |

Table 74: Overview – Diagnosis text

### 4.4.2 Controller parameter

The output of the **control value** is defined with the setting of the control value. Depending on this setting, the other setting options are displayed.

The following table shows the setting options for this parameter:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Control value | ■ **PI control continuous**<br>■ PI control switching (PWM)<br>■ 2-step control (switching) | Defines the control after which the control value is output. |

Table 75: Settings – Control value (Type of controller)

The temperature controller has three different types of controllers that determine the control value. The further configuration options depend on the controller type used.
Depending on the controller type set, the control value controls the heating and/or cooling process. If the control value is selected as a continuous PI control, the communication object for the control value is a 1 Byte object, as the control value can assume several states. If the control value is selected as 2-step control or as PWM control, the communication object is a 1 Bit object, as the control value can only assume 2 states (0; 1).

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 88 | Temperature controller – Control value Heating: Send control value | 1 Bit<br>1 Byte | Controlling the actuator for the heating process.<br>DPT depending on the set parameter. |
| 88 | Temperature controller – Control value Heating/Cooling: Send control value | 1 Bit<br>1 Byte | Controlling the actuator for the heating and cooling process.<br>DPT depending on the set parameter.<br>Available for “2 pipe / 1 circuit” system. |
| 89 | Temperature controller – Control value Cooling: Send control value | 1 Bit<br>1 Byte | Controlling the actuator for the cooling process.<br>DPT depending on the set parameter. |

Table 76: Communication objects – Control value

### 4.4.2.1 PI-control continuous

The following table shows the possible settings for continuous PI control:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Direction of controller | ■ **normal**<br>■ inverted | Specifies the control behaviour with rising temperature. |
| Maximum value of control value | 100 % – 0 %<br>**[100 %]** | Specifies the output power of the control value in maximum operation. |
| Heating system | ■ **Water heating (4K / 120 min)**<br>■ Underfloor heating (4K /150 min)<br>■ Split Unit (4K / 60min)<br>■ Adjustment via control parameter | Setting of the heating system used.<br><br>Individual configuration possible via setting 4. |
| Cooling system | ■ **Split Unit (4K / 60 min)**<br>■ Cooling ceiling (4K / 150 min)<br>■ Adjustment via control parameter | Setting of the cooling system used.<br><br>Individual configuration possible via setting 3. |
| Proportional range | 1 K – 20 K<br>**[4 K]** | Here the proportional band can be set freely.<br>**Only visible with setting “Adjustment via control parameters”.** |
| Reset time | 15 min – 240 min<br>**[150 min]** | The integral range can be freely adjusted here.<br>**Only visible with setting “Adjustment via control parameters”.** |
| Send control value cyclically | not active<br>1 min – 60 min<br>**[5 min]** | Setting whether and at what interval the control value should be sent cyclically. |

**Table 77: Settings – PI control continuous**

PI control is a continuous control with a proportional component, the “P component” and an integral component, the “I component”. The size of the P component is specified in K (Kelvin).
The I component is referred to as reset time and is specified in min (minutes).
The control value for continuous PI control is controlled in steps from 0% up to the set maximum value of the control value.

**Maximum value of control value**
With this setting, the control value to be output can be limited. To prevent switching operations with too high control values, the parameter can be set to a fixed value so that the actuator does not exceed this maximum value.

**Heating/ Cooling system**
The individual control parameters, P-component and I-component are set by adjusting the heating/cooling system used. It is possible to use preset values which are suitable for certain heating or cooling systems or to freely configure the P-controller and I-controller components. The preset values for the respective heating or cooling system are based on empirical values proven in practice and usually lead to good control results.

If a free "**adjustment via control parameters**" is selected, the proportional band and reset time can be freely set.

**Important: This setting requires sufficient knowledge in the field of control engineering!**

**Proportional range**
The proportional band stands for the P-component of a control. The P-component of a control system leads to a proportional increase of the control value to the system deviation.
A small proportional band leads to a fast correction of the system deviation. With a small proportional band, the controller reacts almost abruptly and sets the control value almost to the maximum value (100%) even with small control differences. However, if the proportional band is selected too small, the risk of overshooting is very high.
A proportional band of 4K sets the control value to 100% with a control deviation (difference between setpoint and current temperature) of 4°C. Thus, with this setting, a control deviation of 1°C would result in a control value of 25%.

**Reset time**
The reset time represents the I-component of a regulation. The I-component of a regulation leads to an integral approximation of the process value to the setpoint. A short reset time means that the controller has a large I-component.
A small reset time causes the control value to quickly approach the control value set according to the proportional band. A large reset time, on the other hand, causes the output variable to approach this value slowly.
When making the setting, please note that a reset time that is set too small could cause overshooting. In principle, the larger the reset time, the slower the system.

**Send control value cyclically**
With the aid of the parameter "Send control value cyclically" it can be set whether the channel should send its current status at certain intervals. The time intervals between two transmissions can also be configured.

### 4.4.2.2 PI control switching (PWM)

The PWM control is a further development of the PI control. All settings possible for PI control can also be made here. In addition, the PWM cycle time can be set.

The following table shows the settings for switching PI control:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Direction of controller | ■ **normal**<br>■ inverted | Specifies the control behaviour with rising temperature. |
| Maximum value of control value | 100 % – 0 %<br>**[100 %]** | Specifies the output power of the control value in maximum operation. |
| Heating system | ■ **Water heating (4K / 120 min)**<br>■ Underfloor heating (4K /150 min)<br>■ Split Unit (4K / 60min)<br>■ Adjustment via control parameter | Setting of the heating system used.<br><br>Individual configuration possible via setting 4. |
| Cooling system | ■ **Split Unit (4K / 60 min)**<br>■ Cooling ceiling (4K / 150 min)<br>■ Adjustment via control parameter | Setting of the cooling system used.<br><br>Individual configuration possible via setting 3. |
| Proportional range | 1 K – 20 K<br>**[4 K]** | Here the proportional band can be set freely.<br>**Only visible with setting “Adjustment via control parameters”.** |
| Reset time | 15 min – 240 min<br>**[150 min]** | The integral range can be freely adjusted here.<br>**Only visible with setting “Adjustment via control parameters”.** |
| PWM cycle | 1 min – 30 min<br>**[10 min]** | Setting the PWM cycle time.<br>Includes the total time of a switch-on and switch-off pulse. |
| Send control value cyclically | not active<br>1 min – 60 min<br>**[5 min]** | Setting whether and at what interval the control value should be sent cyclically. |

Table 78: Settings – PI control switching (PWM))

In PWM control, the controller switches the control value according to the value calculated in PI control, considering the cycle time. The control value is thus converted into pulse width modulation (PWM).

**PWM cycle**

The PWM cycle is used for PWM control to calculate the switch-on and switch-off pulse of the control value. This calculation is based on the calculated control value. A PWM cycle comprises the total time from the switch-on point to the new switch-on point.

Example:

If a control value of 75 % is calculated with a set cycle time of 10 minutes, the control value is switched on for 7.5 minutes and switched off for 2.5 minutes.

In principle, the slower the overall system, the longer the cycle time can be set.

**Important:** For PI control switching (PWM), the status can also be output as a percentage value.

The following communication objects are available for this:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 90 | Temperature controller – Control value Heating: Send status | 1 Byte | Sends the status as a percentage value |
| 90 | Temperature controller – Control value Heating/Cooling: Send status | 1 Byte | Sends the status as a percentage value |
| 91 | Temperature controller – Control value Cooling: Send status | 1 Byte | Sends the status as a percentage value |

Table 79: Communication objects – Status control value

### 4.4.2.3 2-step control (switching)

The following table shows the possible settings for 2-step control:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Direction of controller | ■ **normal**<br>■ inverted | Specifies the control behaviour with rising temperature.<br>Adaptation to normally opened valves. |
| Switching hysteresis | 0,5 K – 5,0 K<br>**[2,0 K]** | Setting for upper and lower switch-on and switch-off point. |
| Send control value cyclically | not active<br>1 min – 60 min<br>**[5 min]** | Setting whether and at what interval the control value should be sent cyclically. |

Table 80: Settings – 2-step control (switching)

The 2-step controller is the simplest type of control. Only the two states ON or OFF are sent to the control value.
The controller switches the control value (e.g. heating process) on when the temperature falls below a certain reference temperature and switches it off again when the temperature exceeds a certain reference temperature.
The switch-on and switch-off points, i.e. where the reference temperature is, depend on the currently adjusted set point and the adjusted switching hysteresis.
The 2-step controller is used when the control value can only assume two states, e.g. an electro-thermal valve.

**Switching hysteresis**
The setting of the switching hysteresis is used by the controller to calculate the switch-on and switch-off point. This is done considering the currently valid setpoint.

Example:
In the controller, with mode “Heating”, a basic comfort value of 21 °C and a hysteresis of 2 K are set. In the Comfort mode, this results in an activation temperature of 20 °C and a deactivation temperature of 22 °C.

When making the setting, please note that a large hysteresis leads to a large fluctuation of the actual room temperature. However, a small hysteresis can cause the control value to be switched on and off permanently, as the switch-on and switch-off points are close together

.

### 4.4.2.4 Direction of controller

The direction of controller describes the response of the control value to a change in the system deviation as the temperature rises. The control value can exhibit normal control response to a rising temperature or inverted control response. The direction of action is available for all settings of the control value (PI control; PWM; 2-step).

In PWM and 2-step control, an inverted control value is used for adaptation to valves that are open when no current is applied.

For the individual controllers, an inverted correcting variable, here in the example for operating mode “Heating”, means::

- **PI controller**
  The control value decreases with increasing system deviation and increases with decreasing system deviation.
- **PWM controller**
  The ratio of the duty cycle to the total PWM cycle increases with rising temperature and decreases with falling temperature.
- **2-Punkt controller**
  The controller switches itself on at the actual switch-off point and off at the actual switch-on point.

### 4.4.2.5 Additional settings for Heating & Cooling mode

The following table shows the additional settings in the “Heating and Cooling” operating mode:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| System | ■ **2 pipe / 1 circuit (Heating or Cooling)**<br>■ 4 pipe / 2 circuit (Heating and Cooling simultaneously) | Setting for separate or combined heating / cooling circuits. |
| Switchover Heating/ Cooling | ■ **automatically**<br>■ via object | Setting how the switchover should take place.<br>**Only with controller setting “Setpoints - dependent on setpoint Comfort (Basic)”.** |
| Switchover Heating/ Cooling | via object | Fixed text, not changeable.<br>**Only with controller setting “Setpoints - independent setpoints”.** |

Table 81: Additional settings – Heating and Cooling

The system used can be selected via the “**System**” setting. If there is a common system for the cooling & heating process, the setting 2 pipe/1 circuit is to be selected. If the cooling process and heating process are controlled by two individual units, the setting 4 pipe/2 circuit is to be selected. In addition, it is possible to select between manual switchover between Heating and Cooling operation and automatic switchover when selecting “Setpoints dependent on Comfort setpoint” (in the “Temperature controller” menu).

**2 pipe / 1 circuit**
In a common pipe system for the cooling and heating process, there is only one communication object that controls the control value. The change from “Heating” to “Cooling” or from “Cooling to Heating” is made by a changeover. This can also be used simultaneously for changing between heating and cooling medium in the system. This ensures, for example, that warm water flows in a heating/cooling ceiling during “Heating” and cold water during “Cooling”. In this case only one common controller (PI, PWM or 2-point) can be selected for the control value. The direction of action can also only be defined identically for both processes. However, the individual control parameters for the selected controller can be configured independently of each other.

**4 pipe / 2 circuit**
If there is a separate pipe system for the heating and cooling process, both processes can also be configured separately. Consequently, separate communication objects exist for both control values. This makes it possible to control the heating process e.g. via a PI control and the cooling process e.g. via a 2-step control, as both processes can be controlled by different devices. For each of the two individual processes, completely individual settings for the control value and the heating/cooling system are therefore possible.

**Switchover Heating/Cooling**
Using this setting, it is possible to set whether the controller automatically switches between “Heating” and “Cooling” or whether this process is to be carried out manually via a communication object. With automatic switchover, the controller evaluates the setpoints and knows which mode it is currently in based on the set values and the current actual temperature. If, for example, “Heating” was previously active, the controller switches over as soon as the setpoint for the cooling process is reached. As long as the controller is in the dead zone, the controller remains set to “Heating”, but does not heat as long as the setpoint for the heating process is not exceeded.

If the switchover “via object” is selected, an additional communication object is displayed via which the switchover can be made. With this setting, the controller remains in the selected mode until it receives a signal via the communication object. As long as the controller is in “Heating” mode, for example, only the setpoint for the heating process is considered, even if the controller is actually already in “Cooling” mode from the setpoints. A start of the cooling process is therefore only possible when the controller receives a signal via the communication object that it should switch to the cooling process. If the controller receives a 1 via the communication object, the heating process is switched on, with a 0 the cooling process.

The following table shows the associated communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 110 | Temperature controller – Switchover: 1= Heating, 0 = Cooling | 1 Bit | Switching between “Heating” and “Cooling” Mode: |
| 111 | Temperature controller – Status: 1= Heating, 0 = Cooling | 1 Bit | Sending the status whether “Heating” or “Cooling” mode. |

Table 82: Communication objects – Heating/Cooling switchover

### 4.4.2.6 Additional level

**Important:** The additional level is only available in “Heating” mode.

The following table shows the setting options for additional level:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Additional level | ■ **not active**<br>■ active | Activation of the additional level. |
| Direction of action with rising temperature | ■ **normal**<br>■ inverted | Indicates the control behaviour with increasing temperature. |
| Control value | ■ **2-step control (switching)**<br>■ PI control switching (PWM) | Setting the type of controller that is used. |
| Distance | 0,5 K – 5,0 K<br>**[2,0 K]** | Defining the setpoint of the additional stage as the difference to the current setpoint. |

Table 83: Settings – Additional level

The additional level can be used in slow systems to shorten the heating phase. For example, in the case of underfloor heating (as the basic stage) a radiator or an electric heater could be used as an additional level to shorten the longer heating phase of the slow underfloor heating.

The “**Direction of action ...**” of the control variable can be set as “normal” or “inverted”.

For details, see chapter 4.4.2.4 Direction of controller).

For setting the controller type of the **control value**, the user can choose between 2-step control and PWM control. The communication object of the additional level is therefore always a 1-bit object and only switches the control value ON or OFF.

The setpoint of the additional level can be configured with the parameter “**Distance**”. The set distance is subtracted from the setpoint of the basic level, which then results in the setpoint for the additional level.

Example:
The controller is in Comfort mode for which a basic comfort value of 21 °C has been set. The distance of the additional level has been set to 2.0 K. This results in the following for the setpoint of the additional level: 21 °C - 2.0 K = 19 °C

The table shows the communication object for the additional level:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 92 | Temperature controller – Additional level: Send control value Heating | 1 Bit | Controlling the actuator for the additional level |

Table 84: Communication object – Additional level



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## 4.5 LED settings

The following table shows the possible settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| LED white | ■ **not active**<br>■ active at „Night“; motion (light channel 1)<br>■ active at „Night“; motion (light channel 2)<br>■ active at „Night“; motion (light channel 3)<br>■ Set value via 1 Byte object („Day“ and „Night“)<br>■ active at „Night“, via external object „Switch“<br>■ always ON at „Night“ | Setting whether and how the white LED should be switched on. |
| Brightness at „Night“ | 0 – 100 %<br>**[10 %]** | Defines the brightness value with which the white LED should switch on. |
| RGB LEDs react to | ■ not active<br>■ Presence Detector<br>■ **internal air quality traffic light**<br>■ external objects | Setting whether and to which trigger the RGB LEDs should react. |
| LEDs react to: Presence Detector | | |
| LED Brightness | ■ **always set to „bright“**<br>■ always set to „dark“<br>■ switchover via Day/Night<br>■ switchover via object „Brightness bright=1/dark=0“ | Setting that defines the display behaviour of “bright” and “dark” LEDs. |
| Display motion from light channel 1 / 2 / 3 | ☑ ☐ ☐ | Activation of the light channels whose motion is to be displayed via the RGB LEDs. |
| Display behaviour LED „bright“ | ■ not active<br>■ via free setting<br>■ **via fixed values** | Setting how the colour value for the “LED bright” status is to be defined. |
| RGB value | #000000 ... #FFFFFF<br>**[001900]** | Entering an RGB value.<br>**When selecting “via free setting”.** |
| RGB value | green - bright/medium/dark,<br>red - bright/medium/dark,<br>blue - bright/medium/dark<br>**[green - bright]** | Input of a fixed colour value.<br>**When selecting “via fixed values”.** |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Display behaviour LED „dark“ | ■ not active<br>■ via free setting<br>■ **via fixed values** | Setting how the colour value for the “LED dark” status is to be defined. |
| RGB value | #000000 ... #FFFFFF<br>**[000500]** | Entering an RGB value.<br>**When selecting “via free setting”.** |
| RGB value | green - bright/medium/dark,<br>red - bright/medium/dark,<br>blue - bright/medium/dark<br>**[green - dark]** | Input of a fixed colour value.<br>**When selecting “via fixed values”.** |
| Manual mode ON | ■ **not active**<br>■ active | When the respective function is activated, the same parameters appear with the same options as above (display behaviour LED bright/dark and RGB value for free and fixed setting). The only difference is the default values.<br>For the sake of clarity, these parameters are not listed again. |
| Manual mode OFF | ■ **not active**<br>■ active | |
| Lock/Forced guidance ON | ■ **not active**<br>■ active | |
| Lock/Forced guidance OFF | ■ **not active**<br>■ active | |
| LEDs react to: Internal air quality traffic light | | |
| Brightness of the levels | ■ **always set to „bright“**<br>■ always set to „dark“<br>■ switchover via Day/Night<br>■ switchover via object „Brightness bright=1/dark=0“ | Setting that defines the display behaviour of “bright” and “dark” LEDs. |
| Level 1 / 2 / 3 / 4 | ■ not active<br>■ **display permanently**<br>■ display with time interval | Setting whether and with which behaviour the corresponding “level” should be displayed.<br>**Number of levels (3 or 4) according to the setting in the “Air quality traffic light” menu.** |
| Number of flashes | 1 ... 5<br>**[1]** | Definition of how often the LED should flash.<br>**Only with „display with time interval“.** |
| State flashing at intervals of ... | 10 ... 300 s<br>**[30]** | Setting the interval between flashes.<br>**Only with „display with time interval“.** |
| Value - bright | any colour depending on the selection in the colour field | Setting the respective colour value for the “bright” state. |
| Value - dark | any colour depending on the selection in the colour field | Setting the respective colour value for the “dark” state. |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| LEDs react to: External objects | | |
| Brightness of levels | ■ **always set to „bright“**<br>■ always set to „dark“<br>■ switchover via Day/Night<br>■ switchover via object „Brightness bright=1/dark=0“ | Setting that defines the display behaviour of “bright” and “dark” LEDs. |
| Control by | ■ Traffic light level via 1 Bit objects<br>■ Traffic light level via 1 Byte object<br>■ Colour value via RGB object<br>■ Colour value via HSV object | Setting to which external objects the RGB LEDs should react. |
| Traffic light with | ■ 3 levels<br>■ 4 levels | Definition of how many levels the traffic light control should work with. |
| Level 1 / 2 / 3 / 4 | ■ not active<br>■ **display permanently**<br>■ display with time interval | Setting whether and with which behaviour the corresponding “level” should be displayed.<br>**Number of levels (3 or 4) according to the setting in the “Air quality traffic light” menu.** |
| Number of flashes | 1 ... 5<br>**[1]** | Definition of how often the LED should flash.<br>**Only with „display with time interval“.** |
| State flashing at intervals of ... | 10 ... 300 s<br>**[30]** | Setting the interval between flashes.<br>**Only with „display with time interval“.** |
| Value - bright | any colour depending on the selection in the colour field | Setting the respective colour value for the corresponding traffic light status. |
| Value - dark | any colour depending on the selection in the colour field | Setting the respective colour value for the corresponding traffic light status. |

Table 85: Settings – LED settings

**LED white**

In principle, the white LED serves as a classic night light or orientation light.

The following selection is available for switching the LED:

- **active at „Night“, motion (light channel x):** In Night mode, the LED is switched via detection of the corresponding light channel. Value configurable.
- **Set value via 1 Byte object („Day“ and „Night“):** The LED can be switched as a percentage value in Day and Night mode via the associated 1 Byte object
- **active at „Night“, via external object „Switch“:** The LED can be switched in Night mode via the associated 1 Bit object. Value configurable.
- **always ON at „Night“:** The LED is always switched on in Night mode. Value configurable.

**Note:** If the white LED is active, the brightness value is not evaluated.

**RGB LEDs**

The 3 integrated RGB LEDs can react to different triggers via “**RGB LEDs react to**”. Only one trigger can be used at a time.
With the “**Presence detector**” setting, the RGB LEDs can visualise the motion of one or more light channels, the state of “Manual mode ON/OFF” or the state of “Lock/Forced guidance ON/OFF”. With the “**internal air quality traffic light**” setting, the LEDs react to the status of the air quality traffic light in the device. States can be visualised via “**external objects**” according to the selection under “Control by”. The associated communication objects are displayed for this purpose.

**Basic explanation of the “bright” and “dark” LED parameters**:
The terms “**bright**” and “**dark**” always describe 2 possible display behaviours for a function. It is possible to configure completely different colour values for both display behaviours. The values do not have to be “brighter” or “darker” in the actual sense.
Example:
“bright” can be a bright green, for example, or any freely definable colour.
“dark” can be a dark green or also any freely definable colour.

**LED brightness** (when “Presence detector” is selected) and the **brightness of the levels** (“internal air quality traffic light” and “external objects”) respectively is explained as follows:

- **always set to “bright”**: Only settings for “bright” possible
- **always set to „dark“:** Only settings for “dark” possible
- **Switchover via Day/Night:** Switchover takes place via the Day/Night object. Regardless of the set polarity, the value “1” always applies for “bright”, the value “0” for “dark”.
- **Switchover via object „Brightness (1 = bright / 0 = dark)“:** Switchover takes place by receiving a value on the described object.

For the selection “internal air quality traffic light” and “external objects”, the status of levels and the colour value respectively can be displayed “permanently” or “with time interval” via the LEDs.
In the case of “with time interval”, 2 further parameters appear:

- „**Number of flashes**“: This indicates how often the LED flashes briefly
- **„State flashing at intervals of ...“**: Defines the time interval until the next flashing operation

Example:
The following setting applies for one level:
„Number of flashes“ 3
„State flashing at intervals of ...“ 30 s

If the level is active, the LED flashes three times, after 30 seconds it flashes three times again and so on. This is repeated until the level is no longer active.

The following communication objects are available:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 209 | LED white – Switch | 1 Bit<br>1 Byte | Receipt of a value for switching the LED.<br>DPT according to parameter setting. |
| 210 | RGB traffic light – Input | 1 Byte | Switching a level via 1 Byte object |
| 210 | RGB traffic light – Input | 3 Byte | Switching the LEDs via colour value (RGB/HSV) |
| 210 | RGB traffic light – Input level 1 | 1 Bit | Switching level 1 |
| 211 | RGB traffic light – Input level 2 | 1 Bit | Switching level 2 |
| 212 | RGB traffic light – Input level 3 | 1 Bit | Switching level 3 |
| 213 | RGB traffic light – Input level 4 | 1 Bit | Switching level 4 |
| 214 | RGB traffic light –<br>Brightness (1 = bright / 0 = dark) | 1 Bit | Switch object to define whether the LED is “bright” or “dark” |

**Table 86: Communication object – LED settings**

## 4.6 Brightness

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Light channels influence the brightness measurement | ■ **yes (several lights in the room)**<br>■ no (separate functions) | Setting whether the brightness measurement is influenced by several light sources in the room. |
| Send brightness on change of | not active<br>5 – 50 %<br>**[10 %]** | Rate of change at which the current brightness value is to be sent again. |
| Send measured value cyclically | **not active**<br>5 s – 30 min | Setting whether and at what interval the value should be sent cyclically. |
| Correction of brightness value | | |
| Correction Lux value | -50 % ... 70 %<br>**[10 %]** | Increase/decrease by the set value |
| Room reflection factor | 0,2 – 1<br>**[0,4]** | Reflectance of the environment. |
| Threshold switch | | |
| Threshold switch | ■ **not active**<br>■ active | Activation of a threshold switch |
| Threshold switch switches at | 5 Lux– 1000 Lux<br>**[300 Lux]** | Setting of the threshold at which the threshold switch switches over<br>= defined switch-on point |
| Hysteresis of threshold switch | 5 Lux– 200 Lux<br>**[30 Lux]** | Distance between switch-off and switch-on point.<br>Switch-off point = value for switching the threshold switch - Hysteresis. |
| Object value at “Day” and exceedance | ■ **ON**<br>■ OFF | Setting the value to be sent |
| Object value at “Night” and exceedance | ■ **ON**<br>■ OFF | Setting the value to be sent |
| Object value at lower deviation | ■ **ON**<br>■ OFF | Setting the value to be sent |
| Send at<br>„Day“ / „Night“ | ■ no active<br>■ only ON<br>■ only OFF<br>■ **ON and OFF** | Setting the transmission filter for Day or Night mode |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Teach-in | | |
| Brightness value for Teach-in | 200 ... 1000 Lux<br>**[450 Lux]** | Adjustment value for external read-in. |
| Teach-in value when loading the application | ■ hold Teach in value<br>■ **use default value** | Specifies whether the presence detector should retain the Teach in values after the download or load the factory settings. |

Table 87: Settings – Brightness

The parameter "**Light channels influence brightness measurement**" can be used to set whether several light sources in a room influence each other or not.

Example for setting "Yes":
Light channels 1, 2 and 3 react to the basic setting for brightness (general setting) and switch 3 independent light sources in the room. If, for example, light channel 1 is switched on via an external button and the brightness value of the switch-on threshold is exceeded, the other two channels automatically become "brightness-independent" and can therefore also switch their lamps via motion.

Example for setting "No":
If several light sources are switched in a staircase with one detector, but the positions of these sources have no influence on each other (e.g. indirect LED lighting), each light group can be set to "Basic setting" of the switch-on threshold. If it is now bright due to daylight and the switch-on threshold is exceeded, all indirect LED lights should also no longer switch on.

Furthermore, the **"Sending conditions"** for the measured brightness value can be defined. This can be sent both on a specific **change of** (value in %) and **cyclically** at specific intervals.

Via "**Correction lux value**", the measured lux value is shifted by an adjustable percentage offset. Thus, with a set value of "-50 %", the measured value is reduced by "50 %". Thus, with a measured value of 400 Lux and a correction value of "-50 %", the presence detector would output the value 200.

The "**Reflection factor**" indicates what percentage of the emitted light is reflected back by the environment. A value of "1" means that 100 % of the emitted light is reflected back. For dark floors, a reflection factor of 0.25 is usually suitable.

For example, you measure 400 Lux at workstation height and only 100 Lux under the ceiling. These are then converted to 400 Lux.

In addition, a threshold switch can be set for a certain brightness. This can be set with a hysteresis, which avoids too frequent switching.

The interaction of hysteresis and threshold value is illustrated in the following graphic:
Threshold switch switches at: 1800 Lux
Hysteresis: 600 Lux

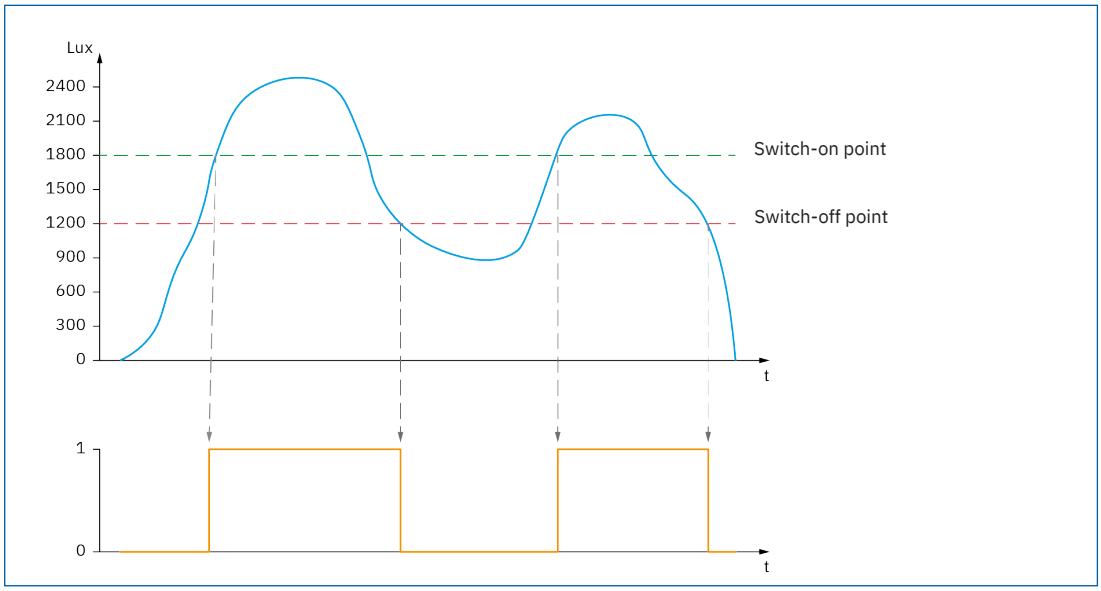



Figure 8: Diagram – Threshold switch / Hysteresis

The **object values** and the **sending conditions** can be set as desired with the other parameters. Both the polarity and a sending filter can be set.

**Teach-in**
If a Teach-in is carried out, the brightness measurement is automatically corrected. The reflection factor should not be changed after a Teach-in. The Teach-in procedure should be carried out to increase the accuracy of the control.

The procedure for Teach-in with constant light control is described in the following chapter

.

### 4.6.1 Procedure for teach-in

In order to be able to use all the advantages of intelligent constant light control, the presence detector should be set once using the Teach-in procedure. A lux meter is required for this. The procedure should be as follows:

1. Adjust the parameter “Lux value for Teach-in” to the desired brightness value.
   Mostly 400-500 Lux are used.
2. Adjust the Parameter “Teach in value at loading of application” to “hold Teach in values”.
3. Make the desired settings for the constant light function. (see chapter “Constant light”).
4. Connect the communication objects for the different light groups with the objects of the dimming actuator.
5. Connect the object “Status absolute dimming value” with the status object of the dimming actuator for the light band in the middle.
6. Connect the object “Start calibration” with a new group address, if the calibration shall be activated via the ETS (Group monitor) or with a push button
7. Download the application.
8. The room must be darkened, or the measurement has to be carried out at dusk. The constant light control learns the brightness and dimming values of the artificial lighting with the Teach-in. If the Teach-in is carried out in daylight/sunlight, the measurement is disturbed and saves incorrect measured values.
9. Activate the Teach-in function by sending a logical “0” to the object “Start calibration”. The green LED in the presence detector starts flashing with a 1 s rhythm. Sending a logical “0” again causes an interruption of the Teach-in process.
10. Change the illuminance by sending dimming commands (relative or absolute) until the lux meter displays the set value (lux value for Teach-in) at workplace level (usually 400 - 500 lux).
11. Now send a logical “1” to the object “Start calibration”. The red and green LED flashes alternating.
12. The presence detector now compares the light measurement, learns the associated dimming value, and learns the brightness values at different dimming values.
13. After successful completion of the Teach-in process, the green LED flashes quickly for 10 seconds. The control is now automatically reactivated and controlled to the setpoint. If an error occurs, the process is aborted and the red LED flashes quickly for 10 seconds. This occurs if, for example, no valid dimming value (status) is received from the dimmer. Then check point 5 above and repeat the process.
14. If the parameter “use switch on dimming value” is adjusted to “calculate switch on value”, the switch on value is calculated automatically now.

The light codes for the LEDs can be taken from the following table:

| LED behaviour | State |
|---|---|
| green LED flashes slowly | Teach-in is activated; detector is in Teach-in mode |
| green and red LED flashes alternately | Teach-in process in progress |
| green LED flashes fast for 10 seconds | Teach-in was successfully completed |
| red LED flashes fast for 10 seconds | Teach-in process failed |

**Table 88: LED behaviour – Teach-in**

The following table shows the relevant communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 216 | Brightness – Threshold switch | 1 Bit | Sends the set value when it is exceeded / fallen below |
| 217 | Brightness – Measured value | 2 Byte | Measured brightness value |
| 218 | Brightness – Set switch-on threshold for light channels | 2 Byte | Here the switch-on threshold Day/Night (see general setting) can be changed via object. The threshold that is currently in operation (Day or Night) is always changed. **Only applies to light channels.** |
| 219 | Input Teach-in – Start calibration | 1 Bit | Starts the adjustment via Teach-in |
| 220 | Input Teach-in – Status absolute dimming value | 1 Byte | Receiving the dimming value status from the dimming actuator |

**Table 89: Communication objects – Brightness and Teach-in**

## 4.7 PIR channels

Three Light channels, one HVAC channel and one Alarm/Message channel can be activated. A separate menu appears for each activated channel.
The Light channels and the HVAC channel are described in the following chapter. The Alarm/Message channel is described in a separate chapter, see 4.7.2 Alarm/Message channel.

The following table shows the available settings:

| ETS Text | Dynamic range<br>[Default value] | Comment |
|---|---|---|
| Light channel 1 – 3 | ■ **not active**<br>■ active | Activation/deactivation of the respective light channel. |
| HVAC channel | ■ **not active**<br>■ active | Activation/deactivation of the HVAC channel. |
| Alarm/Message channel | ■ **not active**<br>■ active | Activation/deactivation of the Alarm/ Message channel. |

Table 90: Settings – PIR channels

### 4.7.1 Light channel/HVAC channel

Light channels and HVAC channel differ only in a few “individual” parameters. Therefore, these channels are described simultaneously below.

#### 4.7.1.1 Basic settings – Light channel

☑ Light channel

The following table shows the available settings:

| ETS Text | Dynamic range<br>[Default value] | Comment |
|---|---|---|
| Active sensors | ■ ---<br>■ 1--<br>:<br>■ **123** | Setting which sensors are active for this channel. |
| Sensitivity | ■ **basic setting (General setting)**<br>■ individual | Setting how the channel should react to sensitivities (triggering, presence). |
| Brightness | ■ **basic setting or object „Switch dark“ is active**<br>■ independent of brightness | Setting how the channel should react to brightness. |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Channel operating mode | ■ **fully automatic**<br>■ half automatic (manual switching) | Setting the operating mode. |
| Motion filter in standby | ■ **not active, no filtering**<br>■ active, filter short motions | Activation of a motion filter on standby (= output is switched off)..<br>**Only in “fully automatic” mode.** |
| Reduction of follow-up time | ■ **not active**<br>■ active | Setting whether a shortening of the follow-up time should be activated. |
| Maximum duration for short time presence | 10 s, **20 s**, 30 s, | Setting the maximum duration for a short-term presence. |
| Follow-up time for short time presence | 10 s, 20 s, **30 s**, 45 s, 60 s, 90 s, 120 s | Setting the follow-up time for short-term presence. |
| Follow-up time “Day” | 1 s – 4 h<br>**[3 min]** | Setting the follow-up time for Day mode. |
| Follow-up time “Night” | 1 s – 4 h<br>**[30 s]** | Setting the follow-up time for Night mode. |

Table 91: Basic settings – Light channel

**Active sensors**
The active sensors can be set for each light channel. This allows the detection range of the channel to be limited. For example, if only one area in a corridor is to be detected, only one sensor can be activated. For the alignment of the sensors, please refer to the illustration under 2.4 Structure & Handling.

**Note:** Due to the lens optics, the individual areas of each sensor scatter. An overlap between sensors is therefore possible and thus no sharp separation between the areas.

**Sensitivity**
With “**basic setting**”, the values from the “General settings” menu refer.
With the “**individual**” setting, the values for the sensitivities for the channel can be set manually. The parameters correspond to those in the “General settings” menu.

**Brightness**
With “**basic setting or object “Switch dark” is active**”, brightness refers to the settings in “General setting” menu. However, this can become brightness-independent via the “Switch dark” object with a “1” and thus switches at any brightness.
No threshold applies via the “**independent of brightness**” setting and the channel always switches.

If the presence detector is set as “**fully automatic**”, every presence detected causes the output to switch on and is switched off again after the follow-up time has elapsed.

In “**half automatic**” mode, the output is switched on via the object “External button short” and automatically switched off again after the follow-up time has elapsed

The “**follow-up time**” describes the time that elapses after the last detection of a movement until the output is switched off. The follow-up time can be set differently for Day/Night. For example, with a follow-up time of 3 minutes, the light would be switched on for at least 3 minutes if motion was detected. Each new detection leads to a re-triggering and thus a restart of the follow-up time.
In addition, a “**reduction of the follow-up time**” can be activated. In this case, two additional parameters are displayed:

- **Maximum duration for short-time presence:** Indicates the duration between the first and the last movement detection to activate the short-time presence.
- **Follow-up time for short-time presence:** Indicates the duration of the follow-up time when the short-time presence was activated.

If the first and last movement was detected within the set duration for short-time presence when short-time presence was activated, the output is not switched on for the regular follow-up time, but only for the follow-up time of the short-time presence

### 4.7.1.2 Basic settings – HVAC channel

☑ HVAC channel

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Active sensors | ▪ ---<br>▪ 1--<br>:<br>▪ **123** | Setting which sensors are active for this channel. |
| Channel operating mode | ▪ **fully automatic**<br>▪ half automatic (manual switching) | Setting the operating mode. |
| Number of monitoring time slots | 1 – 30<br>**[3]** | Setting how many time slots are active.<br>**Only in “fully automatic” mode.** |
| Length of monitoring time slot | 1 – 30<br>**[3]** | Setting the length for each time slot.<br>**Only in “fully automatic” mode.** |
| Follow-up time “Day” | 1 s – 4 h<br>**[3 min]** | Setting the follow-up time for Day mode. |
| Follow-up time “Night” | 1 s – 4 h<br>**[30 s]** | Setting the follow-up time for Night mode. |

**Table 92: Basic settings – HVAC channel**

**Active sensors**
The active sensors can be set for each light channel. This allows the detection range of the channel to be limited. For example, if only one area in a corridor is to be detected, only one sensor can be activated. For the alignment of the sensors, please refer to the illustration under 2.4 Structure & Handling.

**Note:** Due to the lens optics, the individual areas of each sensor scatter. An overlap between sensors is therefore possible and thus no sharp separation between the areas.

If the presence detector is set as "**fully automatic**", every presence detected causes the output to switch on and is switched off again after the follow-up time has elapsed.

In "**half automatic**" mode, the output is switched on via the object "External button short" and automatically switched off again after the follow-up time has elapsed

**Monitoring time slot**
The monitoring time slot is available for the HVAC. This causes a longer detection to be required for switching on. To switch on the channel, at least one detection must have taken place in each of the set monitoring time windows.
The length of the monitoring time slot determines how long the system waits for a detection within a time slot.

The "**follow-up time**" describes the time that elapses after the last detection of a movement until the output is switched off. The follow-up time can be set differently for Day/Night. For example, with a follow-up time of 3 minutes, the light would be switched on for at least 3 minutes if movement was detected. Each new detection leads to a re-triggering and thus a restart of the follow-up time.

### 4.7.1.3 Forced guidance/Lock object

☑ Light channel
☑ HVAC channel

The following table shows the possible settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Forced guidance or lock object | ■ **forced guidance object (2 Bit)**<br>■ lock object<br>■ lock object and lock object ON | Selection of whether a forced guidance object or a lock object is to be used |
| Action on locking | ■ **lock motion (lock current state)**<br>■ switch ON<br>■ switch OFF | Defines the status that is to be sent during locking.<br>**Only if "Lock object" is selected.** |
| Fallback of forced guidance/lock (General settings) | ■ **not active**<br>■ active | Setting whether the channel should react to "Fallback forced guidance/lock" in the menu "General settings". |

Table 93: Settings – Forced guidance/Lock object

The presence detector can be overridden with the forced guidance/lock object and call up a certain status. The **forced guidance object** knows 3 possible states:

- **Force control ON** (control = 1, value = 1)
  The command for "ON" is sent unconditionally to the output object. The evaluation is then stopped and the release time for force control begins. If nothing is received on the force control object after the release time has expired, normal operation is resumed.
- **Force control OFF** (control = 1, value = 0)
  The command for "OFF" is sent unconditionally to the output object. The evaluation is then stopped and the release time for force control begins. If nothing is received on the force control object after the release time has expired, normal operation is resumed.
- **Force control AUTO** (control = 0, value = 0)
  After that the normal operation of the detector is continued.

As an alternative to the force control object, 1 or 2 locking objects of size 1 Bit can be displayed.
3 different states can be configured for the lock object:

- **Lock motion (lock current state)**
  The channel is locked in its current state and remains locked until the locking process is deactivated.
- **Switch ON**
  The channel switches ON and remains in this state until the locking process is deactivated.
- **Switch OFF**
  The channel switches OFF and remains in this state up to when the locking process is deactivated.

By activating "**Lock object ON**", the channel sends the output value ON and remains in the ON state until the locking process is deactivated.

With the parameter "**Fallback of forced guidance/lock (general setting)**", it is possible to set individually for each channel whether it should react to the configuration for "Fallback of forced guidance/lock" in the "General settings" or not.

The following table shows the corresponding communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 125 | Light channel 1 - Input – Lock object | 1 Bit | Locking the light channel |
| 125 | Light channel 1 - Input – Forced guidance | 2 Bit | Activate/deactivate forced guidance |
| 126 | Light channel 1 - Input – Lock object ON | 1 Bit | Switch on the light channel and locking the light channel in the ON state |
| 185 | HVAC - Input – Lock object | 1 Bit | Locking the light channel |
| 185 | HVAC - Input – Forced guidance | 2 Bit | Activate/deactivate forced guidance |
| 186 | HVAC - Input – Lock object ON | 1 Bit | Switch on the light channel and locking the light channel in the ON state |

Table 94: Communication objects – Forced guidance/lock

### 4.7.1.4 Output objects

☑ Light channel
☑ HVAC channel

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Object type for output – Light | ■ **Switch**<br>■ Dimming absolute<br>■ Scene | Selection of the object type that is sent when a motion is detected. |
| Output 2 (Additional switch object) | ■ **not active**<br>■ ON and OFF | Activation of an additional switching object.<br>**Only available for “Light channels”.** |

Table 95: Settings – Output objects

**Object type for output**
The parameter defines the datapoint type of the output object.
These are explained below.

**Output 2 (Additional switch object)**
This object is only available for the light channels. In addition, a separate switch object can be activated - regardless of the object type. This is always a 1 Bit object.

If, for example, a dimming value is sent as output object 1, a 1 Bit telegram can also be sent via output 2 to control a status LED or similar.

**Important:** This object is only available for the light channels.

The settings for the various output types are described in the following chapters.

#### 4.7.1.4.1 Output object: Switch

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Light channels | | |
| Output objects for Day/Night | ■ **one common object**<br>■ separate objects | Setting whether to switch via one or two objects. |
| HVAC channel | | |
| Object value at “Day” for ON | ■ value 0<br>■ **value 1** | Setting the value to be sent for the corresponding operation. |
| Object value at “Day” for OFF | ■ **value 0**<br>■ value 1 | |
| Object value at “Night” for ON | ■ value 0<br>■ **value 1** | |
| Object value at “Night” for OFF | ■ **value 0**<br>■ value 1 | |

Table 96: Settings – Output object: Switch

**Light channels**
If “**one common object**” is selected, the output only ever sends to one object, regardless of whether it is in Day or Night mode.
With “**separate objects**”, 2 switch objects are displayed - one for Day mode and one for Night mode. For example, the main light can be switched on in Day mode and a small orientation light in Night mode.

**HVAC channel**
There is only one output here. The object values for the corresponding operation are defined directly.

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 117 | Light channel 1 - Output 1 – Switch | 1 Bit | Switching function for Day and Night mode |
| 117 | Light channel 1 - Output 1 (Day) – Switch | 1 Bit | Switching function for Day mode |
| 118 | Light channel 1 - Output 1 (Night) – Switch | 1 Bit | Switching function for Night mode |
| 119 | Light channel 1 - Output 2 (additional) – Switch | 1 Bit | Switching function with an additional object |
| 177 | HVAC - Output 1 – Switch | 1 Bit | Switching function of the HVAC channel |

Table 97: Communication objects – Output object: Switch

#### 4.7.1.4.2 Output object: Dimming absolute

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Dimming value at “Day” for ON | 0 % - 100 %<br>**[100 %]** | Setting the value to be sent for the corresponding operation. |
| Dimming value at “Day” for OFF | 0 % - 100 %<br>**[0 %]** | |
| Dimming value at “Night” for ON | 0 % - 100 %<br>**[30 %]** | |
| Dimming value at “Night” for OFF | 0 % - 100 %<br>**[0 %]** | |
| Orientation light for leaving | ■ **switch off immediately**<br>■ other dimming value and switch-off delay | Setting whether the light goes out directly or whether an orientation light should be activated. |
| Switch-off delay for “Day” | not active, 1 s - 60 min<br>**[30 s]** | Activation of a switch-off delay in Day mode. |
| Switch-off dimming value for “Day” | 0 % - 100 %<br>**[0 %]** | Definition of a dimming value for the orientation light in Day mode. |
| Switch-off delay for “Night” | not active, 1 s - 60 min<br>**[30 s]** | Activation of a switch-off delay in Night mode. |
| Switch-off dimming value for “Night” | 0 % - 100 %<br>**[0 %]** | Definition of a dimming value for the orientation light in Night mode. |

**Table 98: Settings – Output object: Dimming absolute**

With the “**Dimming values at Day/Night for ON/OFF**”, the corresponding absolute values are defined that the channel sends after detection or after the follow-up time has elapsed. New values can be specified via the “ Teach-in dimming value for ON” objects.
If the channel is in Day mode, the corresponding ON value for “Day” is changed.
If the channel is in Night mode, the corresponding ON value for “Night” is changed.

In addition, an ”**Orientation light for leaving**” the room can be activated. The orientation light is called up when the follow-up time of the light channel has elapsed. Without the orientation light, the channel would be switched off immediately. The orientation light now causes the output to call up the configured value for the switch-off delay for Day/Night and the light channel is only switched off when the switch-off delay for Day/Night has elapsed.

For the light channels (not HVAC), an additional “Switch” output object can also be displayed.

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 117 | Light channel 1 - Output 1 – Dimming absolute | 1 Byte | Sending an absolute dimming value. |
| 119 | Light channel 1 - Output 2 (additional) – Switching | 1 Bit | Additional switching function of the light channel. |
| 129 | Light channel 1 - Input – Teach-in dimming value for ON | 1 Byte | Presetting a new dimming value when switch-on. |
| 177 | HVAC - Output 1 – Dimming absolute | 1 Byte | Sending an absolute dimming value. |
| 189 | HVAC - Input – Teach-in dimming value for ON | 1 Byte | Presetting a new dimming value when switch-on. |

Table 99: Communication objects – Output object: Dimming absolute

### 4.7.1.4.3 Output object: Scene

The following table shows the available settings:

| ETS Text | Dynamic range **[Default value]** | Comment |
|---|---|---|
| Scene number at „Day“ for ON | 1 - 64 **[1]** | Setting the scene to be sent for the corresponding operation. |
| Scene number at „Day“ for OFF | 1 - 64 **[2]** | |
| Scene number at „Night“ for ON | 1 - 64 **[3]** | |
| Scene number at „Night“ for OFF | 1 - 64 **[4]** | |

Table 100: Settings – Output object: Scene

**Note:** For the light channels (not HVAC), an additional “Switch” output object can also be displayed.
The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 117 | Light channel 1 - Output 1 – Scene | 1 Byte | Sending a scene number. |
| 119 | Light channel 1 - Output 2 (additional) – Switch | 1 Bit | Additional switching function of the light channel. |
| 177 | HVAC - Output 1 – Scene | 1 Byte | Sending a scene number. |

Table 101: Communication objects – Output object: Scene

#### 4.7.1.4.4 Sending conditions for output objects

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Object type for output: Switch | | |
| Output object 1 sends | ■ only ON<br>■ only Off<br>■ **ON and OFF** | Setting the sending filter. |
| Output object 1 sends ON cyclically | **not active**<br>10 s – 60 min | Setting the sending interval.<br>**Only for "light channel"** |
| Output object 1 sends cyclically | **not active**<br>10 s – 60 min | Setting the sending interval.<br>**Only for "HVAC channel"** |
| Output 2 (additional switch object) | ■ **not active**<br>■ ON and OFF | Setting whether output 2 should be sent cyclically.<br>**Only for "light channel"** |
| Object type for output: Dimming absolute | | |
| Output object 1 sends | ■ only dimming value for ON<br>■ only dimming value for OFF<br>■ **Dimming value for ON and OFF** | Setting the sending filter. |
| Output object 1 sends value for ON cyclically | **not active**<br>10 s – 60 min | Setting the sending interval.<br>**Only for "light channel"** |
| Output object 1 sends value cyclically | **not active**<br>10 s – 60 min | Setting the sending interval.<br>**Only for "HVAC channel"** |
| Output 2 (additional switch object) | ■ **not active**<br>■ ON and OFF | Setting whether output 2 should be sent cyclically.<br>**Only for "light channel"** |
| Object type for output: Scene | | |
| Output object 1 sends | ■ only scene number for ON<br>■ only scene number for OFF<br>■ **Scene number for ON and OFF** | Setting the sending filter. |
| Output object 1 sends scene for ON cyclically | **not active**<br>10 s – 60 min | Setting the sending interval.<br>**Only for "light channel"** |
| Output object 1 sends scene cyclically | **not active**<br>10 s – 60 min | Setting the sending interval.<br>**Only for "HVAC channel"** |
| Output 2 (additional switch object) | ■ **not active**<br>■ ON and OFF | Setting whether output 2 should be sent cyclically.<br>**Only for "light channel"** |

Table 102: Settings – Sending conditions for output objects

**Important:** Parameters for the sending conditions are only available in “fully automatic” operating mode!

“**Output object 1 sends**” defines which value is to be sent at the output. Different values can be defined for “Day” and “Night” as well as for ON (motion detected) and OFF (after the follow-up time has elapsed).

The parameter “Output object 1 sends cyclically...” differs for the Light channel and HVAC channel

**Light channel**:
Output object 1 (for each selection) can only send the configured value cyclically for ON.
The additional switching object (output 2) can also send its value cyclically. The interval corresponds to that of output object 1, where the values ON and OFF are always sent cyclically.

**HVAC channel:**
In contrast to the light channel, the HVAC channel for output object 1 can send the value for ON and OFF cyclically.

### 4.7.1.5 External button short/long

☑ Light channel
☑ HVAC channel

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| External button short/ long reacts to | ■ only ON<br>■ only OFF<br>■ **ON and OFF**<br>■ toggle on telegram input | Selection of which telegrams are valid for the external button |
| External button short: | | |
| If night light is active | ■ **switch to Day light**<br>■ stay at Night light | Setting what should happen when external button is shortly pressed while Night light is active. |
| If output “Day” is already ON | ■ stay in automatic mode<br>■ **switch to manual mode** | Setting the operating mode when output is already ON at “Day”.<br>**Only with „switch to Day light“.** |
| If output is already ON | ■ stay in automatic mode<br>■ **switch to manual mode** | Setting the operating mode when the output is already ON.<br>**Only with „stay at Night light“.** |

**Table 103: Settings – External button short/long**

**„external button short"** is used to manually switch between the states of the light channel or to switch on the light channel in the half-automatic operating mode.

**"external button long"** is used to manually switch the light channel ON/OFF.

The external button input can be used to switch on the light/HVAC channel independently of a motion detection. The exact procedures for the "external button short/long" are explained in more detail in chapter 4.7.1.8 Process diagrams.

The parameters for "idle time" are described in the following chapter 4.7.1.6 Idle time.

The following table shows the available communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 120 | Light channel 1 - Input – External button short | 1 Bit | Object for the input of an external button |
| 121 | Light channel 1 - Input – External button long | 1 Bit | Object for the input of an external button |
| 180 | HVAC - Input – External button short | 1 Bit | Object for the input of an external button |
| 181 | HVAC - Input – External button long | 1 Bit | Object for the input of an external button |

**Table 104: Communication objects – External button short/long**

### 4.7.1.6 Idle time

☑ Light channel
☑ HVAC channel

The following table shows the available settings:

| ETS Text | Dynamic range **[Default value]** | Comment |
|---|---|---|
| Idle time after external button short is OFF | 1 ... 30 s **[5 s]** | Setting of the time for which the presence detector is locked for further detection after it has been switched off via "external button short". |
| Idle time after switch-off | 0 ... 60 s **[1 s]** | Setting the time for which the presence detector is locked for further detection after the follow-up time has expired. |

**Table 105: Settings – Idle time**

The parameter "**Idle time after external button short OFF**" is useful, for example, to leave the room briefly after switching OFF via the external push-button without avoiding a renewed switching ON of the light by detection.

### 4.7.1.7 Status information

☑ Light channel
☑ HVAC channel

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Status information | ■ **not active**<br>■ Sends value 1 for automatic mode<br>■ Sends value 1 for lock/manual mode | Activation of a status object. |

Table 106: Settings – Status information

When activated, a status object is available in each case.

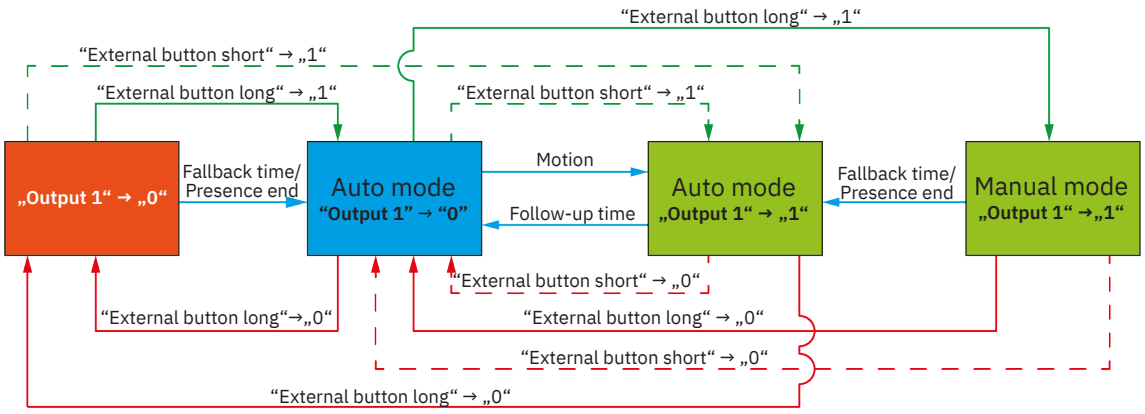
The following table shows the possible communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 127 | Light channel 1 - Status – Automatic mode | 1 Bit | Sends the current status |
| 127 | Light channel 1 - Status – Lock/manual mode | 1 Bit | Sends the current status |
| 187 | HVAC - Status – Automatic mode | 1 Bit | Sends the current status |
| 187 | HVAC - Status – Lock/manual mode | 1 Bit | Sends the current status |

Table 107: Communication objects – Status information

## 4.7.1.8 Process diagrams

### 4.7.1.8.1 Fully automatic without orientation light




**States:**

**Manual mode, OFF:** The output is switched OFF, the presence detector has been switched OFF manually.

**Auto mode, Standby:** The output is switched OFF, the presence detector switches ON automatically when motion is detected.

**Auto mode, ON:** The output is switched ON, the presence detector switches OFF automatically when the follow-up time expires.

**Manual mode, ON:** The output is switched ON, the presence detector has been switched ON manually.

**State transitions:**

**External button OFF:** Sending an OFF telegram to object “External button short”.

**External button ON:** Sending an ON telegram to object “External button short”.

**Motion:** Presence detector detects motion

**Follow-up time:** Expiry of the follow-up time set in the light channel.

**Fallback time / Presence end:** Expiry of the fallback time set in the general settings for the external button input.

**External button “long ON/OFF”:**
Activates / deactivates manual mode.

Figure 9: Process diagram – Fully automatic without orientation light

In the operating mode “Fully automatic” the Presence Detector switches on automatically when motion is detected. The object “External button short” can be used to override the automatic mode and force the device into manual mode. From this mode, the detector automatically returns to auto mode according to the settings in the menu “General settings - Fallback: External button long”.

If the output of the light channel is switched on (automatic mode - ON or manual mode - ON) and the light channel is switched off via the object “External button short”, then the light channel is blocked for 10 seconds for motion detection in order to leave the room and prevent brief restart.

The detector can be switched to manual mode via the object “External button long”. From this mode, the detector automatically returns to auto mode according to the settings in the “General settings - Fallback: External button long”.

**Extended application example 1:**
The room is entered, the detector detects presence and switches on the lighting group. However, the light should be switched off for the duration of the presence and automatically switched on again when the room is entered again.

To implement this scenario, you have to set the parameter “Fallback: External button long” in the menu “General settings” as follows:

| | |
|---|---|
| Fallback: External button long (Manual => Auto) | after presence and follow-up time |
| Manual mode, follow-up time at ON “Day” | 3 min |
| Manual mode, follow-up time at OFF “Day” | 3 min |
| Manual mode, follow-up time at ON “Night” | 3 min |
| Manual mode, follow-up time at OFF “Night” | 3 min |

**Table 108: Settings – Application example 1**

The follow-up time can be set as desired according to your own requirements. Now the object “External button long” (light channel 1) is connected to the push-button which is to switch off the light.

After pressing the button, the light remains OFF (manual mode state, OFF) as long as the detector detects presence and then for the set follow-up time for the external button. The light is then switched off and the light channel changes to the state “Auto mode, ready”.

**Extended application example 2:**
The room is entered, the detector detects presence, but the light is not switched on because the set brightness threshold is not exceeded. However, the light should be switched on for the duration of the presence and switched off again automatically after leaving the room.

To implement this scenario, you have to set the parameter “Fallback: External button long” in the menu “General settings” as follows:

| | |
|---|---|
| Fallback: External button long (Manual => Auto) | after presence and follow-up time |
| Manual mode, follow-up time at ON “Day” | 3 min |
| Manual mode, follow-up time at OFF “Day” | 3 min |
| Manual mode, follow-up time at ON “Night” | 3 min |
| Manual mode, follow-up time at OFF “Night” | 3 min |

**Table 109: Settings – Application example 2**

The follow-up time can be set as desired according to your own requirements. Now the object “External button long” (light channel 1) is connected to the push-button which is to switch on the light.

After the button has been pressed, the light remains ON (manual mode state, ON) as long as the detector detects presence and then for the set follow-up time for the external button. The light is then switched OFF and the light channel changes to the state “Auto mode, ready”

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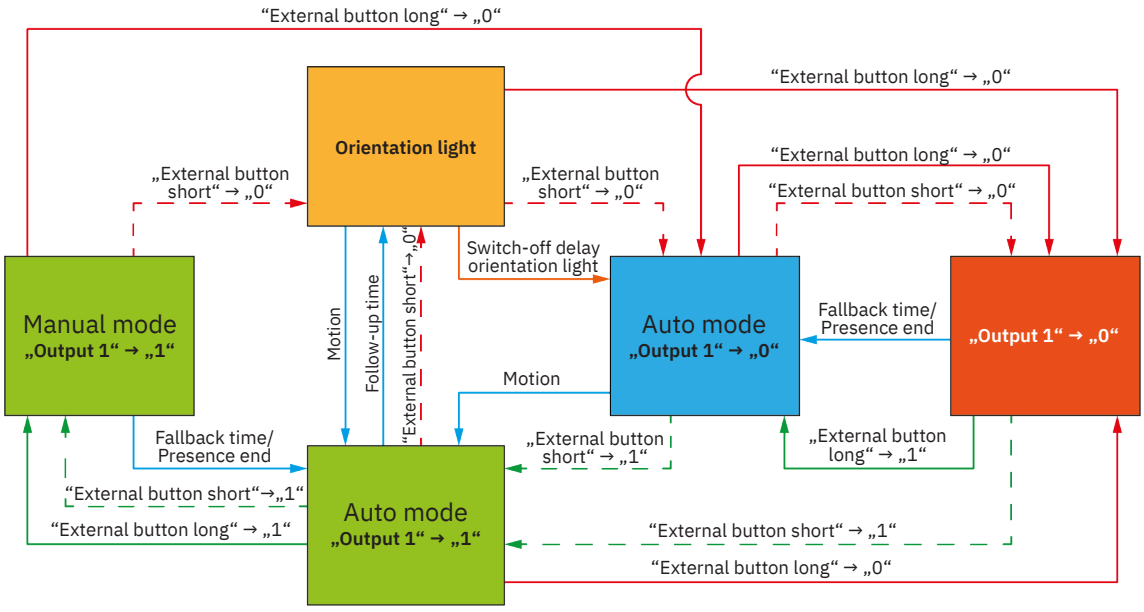
## 4.7.1.8.2 Fully automatic with orientation light




**States:**

**Manual mode, OFF:** The output is switched OFF, the presence detector has been switched OFF manually.

**Auto mode, Standby:** The output is switched OFF, the presence detector switches ON automatically when motion is detected.

**Auto mode, ON:** The output is switched ON, the presence detector switches OFF automatically when the follow-up time expires.

**Manual mode, ON:** The output is switched ON, the presence detector has been switched ON manually.

**Orientation light:** The output switches to the dimming value of the orientation light.

**State transitions:**

**External button OFF:** Sending an OFF telegram to object “External button short”.

**External button ON:** Sending an ON telegram to object “External button short”.

**Motion:** Presence detector detects motion

**Follow-up time:** Expiry of the follow-up time set in the light channel.

**Fallback time / Presence end:** Expiry of the fallback time set in the general settings for the external button input.

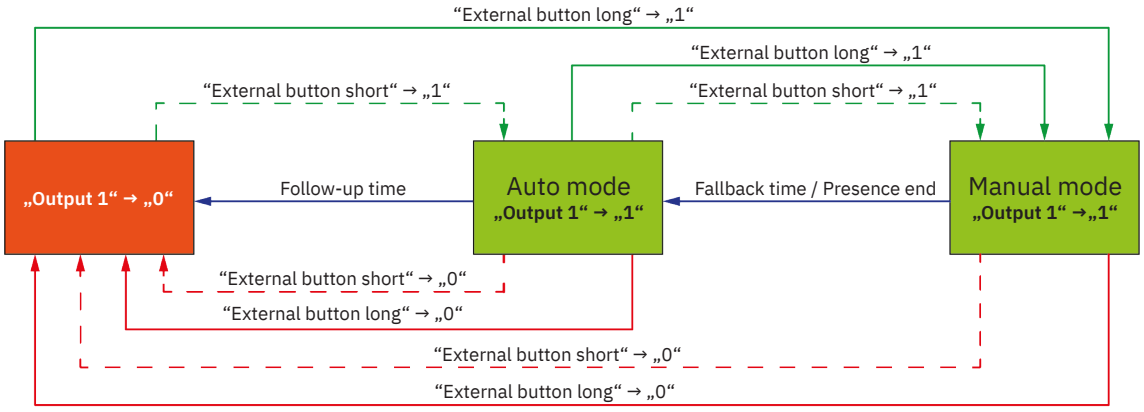
**External button “long ON/OFF”:**
Activates / deactivates manual mode.

**Switch-off delay orientation light:** Set switch-off delay with active orientation light.

Figure 10: Process diagram – Fully automatic with orientation light

The operating mode “fully automatic with orientation light” extends the operating mode fully automatic by the status orientation light. The orientation light can be activated as soon as the “Object type for output - light” parameter is set to “Dimming absolute”.
The orientation light is switched on as soon as the follow-up time of the light channel has elapsed. The output is then switched to the orientation light state and can therefore dim the light to a darker level in order to leave the room safely.

## 4.7.1.8.3 Half automatic without orientation light




**States:**

**OFF:** The output is switched OFF and must be switched ON manually.

**Auto mode ON:** The output is switched ON, the presence detector switches OFF automatically at the end of the follow-up time.

**Manual mode ON:** The output is switched ON, the presence detector has been switched ON manually.

**State transitions:**

**External button OFF:** Sending an OFF telegram to object “External button short”.

**External button ON:** Sending an ON telegram to object “External button short”.

**Follow up time:** Expiry of the follow-up time set in the light channel.

**Fallback time / Presence end:** Expiry of the fallback time set in the general settings for the external button input.

**External button “long ON/OFF”:** Activates/deactivates manual mode.

**Figure 11: Process diagram – Half automatic without orientation light**

In the operating mode “half automatic”, the motion detector has to be switched on manually via the object “external button short”. The light channel is automatically switched off again after the follow-up time (= no movement detection during the set follow-up time) has elapsed.
The light channel can also be overridden via the “external button short” object. The motion detector can be switched to manual mode by pressing twice.

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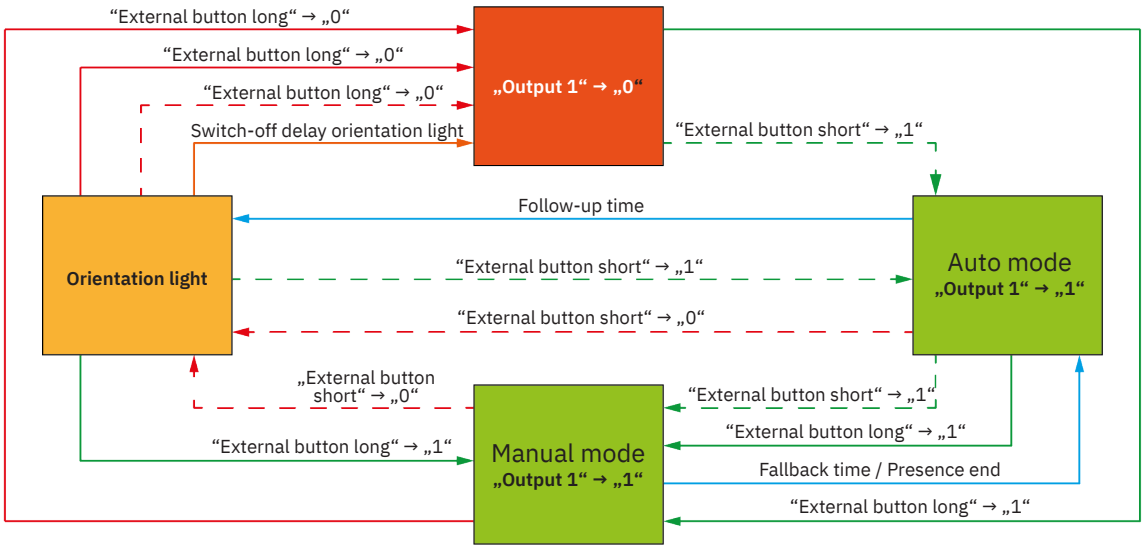
## 4.7.1.8.4 Half automatic with orientation light




**States**:

**OFF:** The output is switched OFF and must be switched ON manually.

**Auto mode ON:** The output is switched ON, the presence detector switches OFF automatically at the end of the follow-up time.

**Manual mode ON:** The output is switched ON, the presence detector has been switched ON manually.

**Orientation light:** The output switches to the dimming value of the orientation light.

**State transitions:**

**External button OFF:** Sending an OFF telegram to object "External button short".

**External button ON:** Sending an ON telegram to object "External button short".

**Follow up time:** Expiry of the follow-up time set in the light channel.

**Fallback time / Presence end:** Expiry of the fallback time set in the general settings for the external button input.

**External button "long ON/OFF":** Activates/deactivates manual mode.

**Switch-off delay orientation light:** Set switch-off delay when the orientation light is active.

**Figure 12: Process diagram - Half automatic with orientation light**

The operating mode "half-automatic with orientation light" extends the operating mode half-automatic by the orientation light state. The orientation light can be activated as soon as the "Object type for output - light" parameter is set to "Dimming absolute".
The orientation light is switched on as soon as the follow-up time of the light channel has elapsed. The output is then switched to the orientation light state and can therefore dim the light to a darker level in order to leave the room safely

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### 4.7.1.9 Master/Slave Operation

The following is a short description of the settings. For more details, there is a suggested solution on our website https://www.mdt.de/fuer-profis/tipps-tricks.html under „Presence Detector“.

#### 4.7.1.9.1 Light channels

In larger rooms, the use of a single motion detector is often not sufficient. In order to detect motion in every corner of the room, several detectors have to be used throughout the entire room. Here, however, a detected motion should always lead to the same settings regardless of the corner of the room in which the presence was detected. For this purpose, one detector is switched as master and any number of others as slaves.
The settings for the master-slave control are made in the menu of the respective light channels.
The master is configured as desired as a fully or half-automatic unit.
A value of 3-5 minutes is recommended for the follow-up time.
Slaves are set as follows:

- The brightness must be set to “**independent of brightness**”.
- Set the operating mode of the channel to “**fully automatic**”.
- The “**follow-up time”** should be significantly shorter than that of the master.
- Object type for output – light to “**Switch**”
- The output object sends “**only ON**”.
- A value of 30 seconds is recommended for the time “**Output object sends ON cyclically**”.

The “slaves” send their output object for “switch” to the “external motion (slave)” object of the master

#### 4.7.1.9.2 HVAC channel / Alarm/Message channel

The master-slave control can also be applied to the HVAC/Alarm channels. The settings for the “slave” are the same as for the slaves for the lighting groups. However, the settings for the brightness values are omitted for the HVAC/alarm channel. The observation windows are to be set according to the individual requirements.

**Important:** As long as the slave is in its follow-up time, it cyclically sends a “1” to the master. After the last “1” has been sent to the master, the master’s follow-up time elapses before the master switches off its output. In this case, the follow-up time of the master and slave are added up.

### 4.7.2 Alarm/Message channel

The Alarm / Message function can be used to monitor a room in case of absence and to call up certain actions in the KNX system when motion is detected.

**Important: The Alarm / Message channel is always brightness independent.**

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Active sensors | ■ ---<br>■ 1--<br>:<br>■ 123 | Setting which sensors are active for this channel. |
| Trigger sensitivity “Day” | 1 – 6<br>**[3 (low)]** | Setting the trigger sensitivity in day mode. |
| Trigger sensitivity “Night” | 1 – 6<br>**[2]** | Setting the trigger sensitivity in night mode. |
| Presence sensitivity | 1 – 8<br>**[6]** | Setting the sensitivity when presence is detected. |
| Reduce sensitivity for sensors | ■ **1--**<br>■ -2-<br>:<br>■ -23 | Setting to change the sensitivity of single sensors. |
| Trigger sensitivity “Day” | 1 – 5<br>**[3 (low)]** | Changed sensitivity in day mode. |
| Trigger sensitivity “Night” | 1 – 5<br>**[2]** | Changed sensitivity in night mode. |
| Presence sensitivity | 1 – 10<br>**[6]** | Changed sensitivity for presence detection. |
| Interference/motion filter | ■ **not active, no filtering**<br>■ active, filter interferences/ short motions | Activation of a motion filter on standby (= output is switched off). |
| Length of monitoring time slot | 1 ... 5 s<br>**[2 s]** | Setting the time for how long a time window is open for detection.<br>**Only if “Interference/motion filter” is “active”.** |
| Number of monitoring time slots | 2 ... 5<br>**[3]** | Setting how many time windows are open for detection.<br>**Only if “Interference/motion filter” is “active”.** |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Follow-up time „Day“ | 1 s ... 4 h<br>**[3 min]** | Setting the follow-up time in day mode. |
| Follow-up time „Night“ | 1 s ... 4 h<br>**[30 s]** | Setting the follow-up time in night mode. |
| Lock or release object | ■ **lock object**<br>■ release object | Setting whether a locking or release object is to be used. |
| Fallback of forced guidance/lock (General settings) | ■ **not active**<br>■ active | Setting whether the channel should react to “Fallback forced guidance/lock” in the menu “General settings”.<br>**Only available with “lock object”.** |
| Output objects for Day/ Night | ■ **one common object**<br>■ separate objects | Setting whether “Day” and “Night” should be sent via one object or separate objects. |
| Output object sends at | ■ only ON<br>■ **ON and OFF** | Output filter for the first output object. |
| Output object sends cyclic | **not active**<br>10 s ... 60 min | Activation of cyclic sending for the output object. |

Table 110: Settings – Alarm/Message channel

**Active sensors** can be set for each channel. This allows the detection range of the channel to be limited. For example, if only one direction is to be detected in a corridor, only one sensor can be activated. For the alignment of the sensors, please refer to the illustration under 2.4 Structure & Handling.
**Note:** Due to the lens optics, the individual areas of each sensor scatter. Overlapping between sensors is therefore possible and consequently there is no sharp separation between the areas.

The “**Trigger sensitivity “Day”/”Night””** describes the sensitivity in standby mode (the output is switched off, no movement was detected).

The “**Presence sensitivity**” describes the sensitivity in presence mode (the output is switched on, movement was detected).

“**Reduce sensitivity for sensors**” can be used, for example, if one or more sensors are to react less sensitively for structural reasons.

To avoid false detections, an “**Interference/motion filter**” can be activated that filters out very short movements, e.g., due to draughts. If this filter is activated, 2 additional parameters appear: “**Length of monitoring time slot**” and “**Number of monitoring time slots**”.
This means that a longer detection is required for switching on. To switch on the channel at least one detection must have taken place in each of the set monitoring time slots. For example, with 3 monitoring time slots and a length of 2 seconds for a monitoring time slot, at least one detection would have to take place in the first 2 seconds, at least one detection in the second 2 seconds and at least one detection in the third 2 seconds. Thus, it takes at least 6 seconds for the alarm channel to trigger. If the motion filter is not activated, the detection takes place for only one motion with the sensitivity set accordingly.



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The “**Follow-up time**” describes the time that elapses after the last detection of a movement until the output is switched off. For example, with a follow-up time of 3 minutes, the light would be switched on for at least 3 minutes if movement was detected. Each new detection restarts the follow-up time. This time can be set differently for Day and Night.

A “**lock object or release object**” can be activated to lock or enable the Alarm channel. The lock object switches the channel OFF with a “1”. The release object activates the Alarm channel with a “1”. With the parameter “**Fallback forced guidance/lock (General setting)**”, you can set whether the channel should react to the configuration for “Fallback forced guidance/lock” in the “General settings”.

With “**Output objects for Day/Night**” you can set whether switching is done via a common object or separate objects for Day and Night. Using separate objects, for example, a different action can be carried out for “Day” than for “Night”.

With the parameter “**Output object sends**”, a send filter can be activated for the output. If the output is only to send ON commands the setting “only ON” can be used.

Via “**Output object sends cyclically**”, it can be set that the output object sends its value cyclically to the bus at an interval to be defined.

The following table shows the corresponding communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 192 | Alarm - Output – Switch | 1 Bit | Sending an alarm (common object) |
| 192 | Alarm - Output (Tag) – Switch | 1 Bit | Sending an alarm in day mode |
| 193 | Alarm - Output (Night) – Switch | 1 Bit | Sending an alarm in night mode |
| 200 | Alarm - Input – Lock | 1 Bit | Locking the Alarm/Message function |
| 200 | Alarm - Input – Release | 1 Bit | Releasing the Alarm/Message function |

**Table 111: Communication objects – Alarm/Message channel**

### 4.7.3 Scenes

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Scene A – H number | 1 – 64<br>**[not active]** | Activation of a scene. |
| Scene A (– H)<br>Light channel 1 (– 3) | ■ **not active**<br>■ lock active, ON<br>■ lock active, OFF<br>■ lock active, lock<br>■ disable lock (last state))<br>■ disable lock, OFF<br>■ set external button short to value “1”<br>■ set external button short to value “0”<br>■ set external button long (manual mode) to value “1”<br>■ set external button long (manual mode) to value “0”<br>■ set object Day/Night to “Day” (for all channels)<br>■ set object Day/Night to “Night” (for all channels) | Setting the action to be executed for calling up a scene. |

Table 112: Settings – Scenes

The scene function can be used to trigger actions for the light channels involved by sending the corresponding scene numbers.

**Important:** Scenes are only possible for Light channels - not for HVAC and Alarm/Message channels.

Only actions for Light channels that have been activated in the “PIR channels” menu can be set.

The following table shows the corresponding communication object:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 215 | PIR Scenes – Input | 1 Byte | Calling up a scene |

Table 113: Communication object – Scene

## 4.8 Constant light

With the proportional master/slave constant light control, it is possible to intelligently control the light in the room so that external influences can be almost eliminated. By controlling up to 3 light groups - wall, middle, window - the light in the room can be kept constant despite the influence of sunlight and other light sources.

**Hinweis:** The selection of lighting groups should be set to 1 lighting group or 1 lighting group + HVAC. Constant lighting control with 2 lighting groups (zones) is not useful.

The figure below illustrates the principle of constant lighting control:

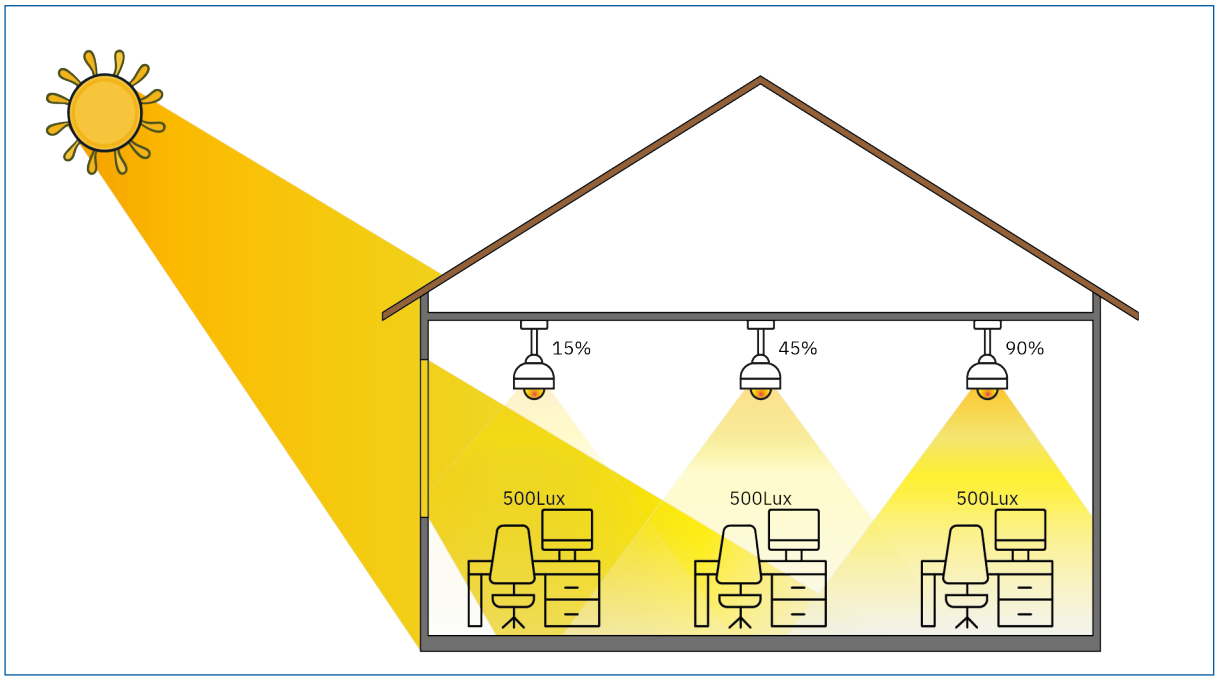


Figure 13: Operating principle – Proportional zone control

### 4.8.1 General Settings/ Principle of control

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Constant light control | ■ **not active**<br>■ active | Activation/Deactivation of the constant light control. |
| Control sunlight | ■ normal<br>■ **little**<br>■ very little | defines the influence of the solar radiation to the regulation. |
| Selection of lighting groups | ■ **1 lighting group**<br>■ lighting group middle + wall<br>■ lighting group middle + window<br>■ lighting group middle + wall + window | Selection of the light bands, which shall be controlled. |
| Influence of proportional zone control - wall | ■ no change (x 1)<br>■ very low (x 1,2)<br>■ low (x 1,4)<br>■ **medium (x 1,6)**<br>■ high (x 1,8)<br>■ very high (x 2) | Defines the influence of the lighting group “wall” to the constant level light regulation.<br>**Only with selection of lighting groups “wall”** |
| Influence of proportional zone control - window | ■ no change (x 1)<br>■ very low (x 0,9)<br>■ low (x 0,8)<br>■ **medium (x 0,7)**<br>■ high (x 0,6)<br>■ very high (x 0,5) | Defines the influence of the lighting group “window” to the constant level light regulation.<br>**Only with selection of lighting groups “window”** |

**Table 114: Settings – Constant light control**

The parameter “**Influence of proportional zone control**” specifies how strong the influence of the lighting group on the control should be. The setting “no influence” (x 1) switches off the proportionality of the control and all lighting groups always light up with the same value. The setting “very strong” (0.5 for window and 2 for wall) means that the difference between the absolute dimming values at the wall and window is very large.
If a room is to be controlled using the constant light control, it is recommended to use the Teach-in procedure, as this is the only way to achieve good results.
The influences of the wall and window lighting groups have to be adapted to the specific conditions. Simplified, the larger the room, the stronger the control factor has to be, i.e., the stronger the influence has to deviate from 1. However, the parameters should always be checked on site and corrected if necessary.

Adjustment of the control is possible via the “**Control sunlight**” parameter. If the Presence Detector reduces the light in the room too much when the sun is shining, the value for this parameter should be set to little or very little. Alternatively, the Presence Detector can also be moved further into the middle of the room.

The following diagram illustrates the dimming behaviour for the 3 lighting groups with different levels of sunlight. In this example, the Teach-in value was reached at an absolute dimming value of 80 % with 450 lux, the influences were both set to “medium”.

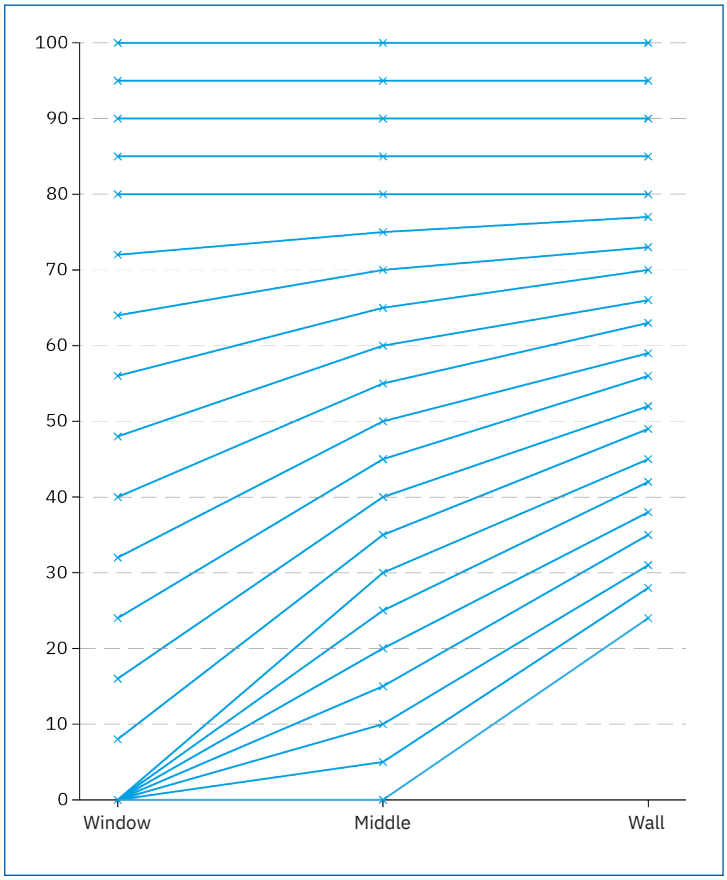


**Figure 14: Diagram – Behaviour of proportional zone control**

It is obvious that depending on the intensity of the sunlight, the window side is dimmed down more than the middle, and the wall side correspondingly more slowly.
When the solar radiation decreases again, all light strips are regulated to 80 % again.

If the light intensity is set, for example, from 450 lux to 300 lux (relative dimming, absolute dimming or scene), the control factors are only used automatically at the correct dimming value. In this case for example, 50%. Without sunlight, all three light strips then regulate to 300 lux with 50 % dimming value. With sunlight, the dimming values below 50 % shift accordingly.

With the new “proportional master/slave constant light control”, all disadvantages of the commercially available “offset master/slave constant light control” with fixed offset have been eliminated.

The following diagram shows the influence of the different control parameters to the regulation:

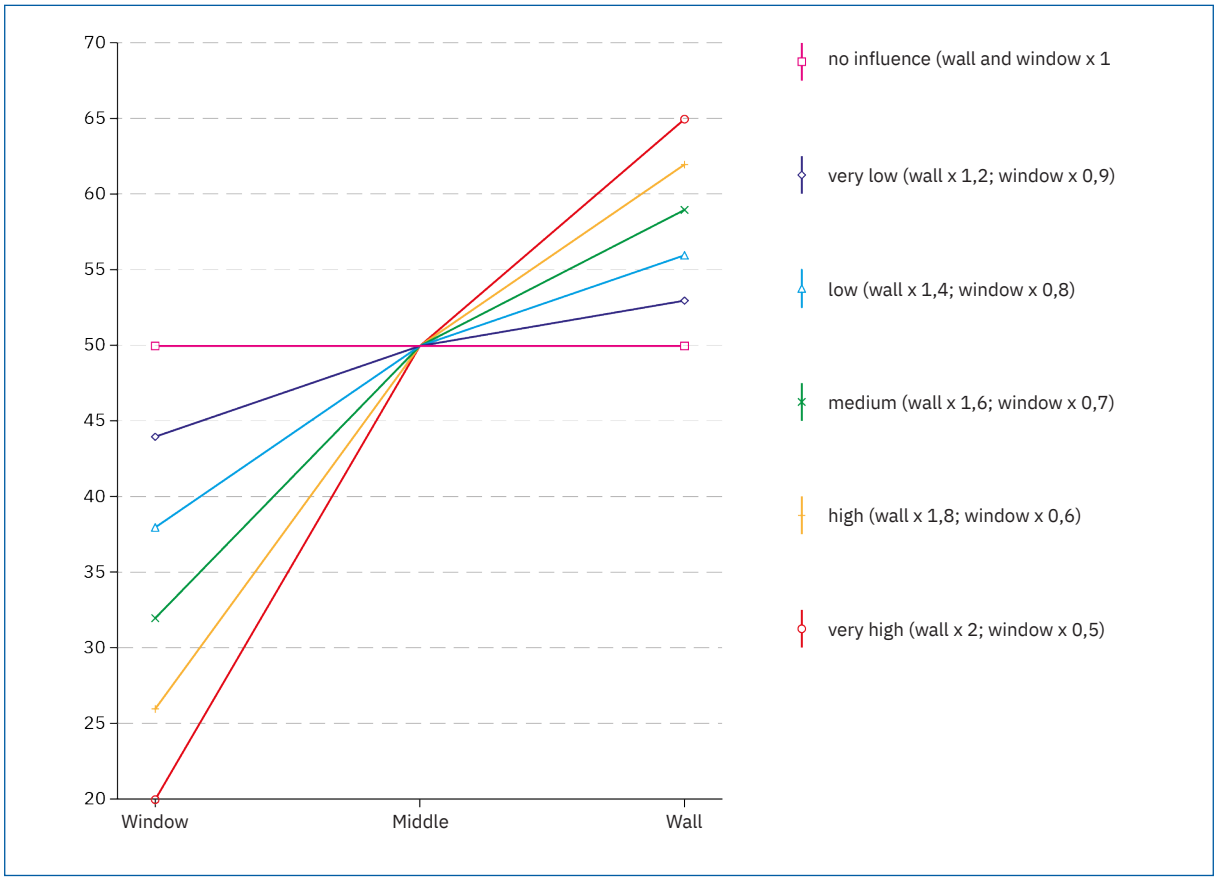


**Figure 15: Diagram – Influence of control parameters**

## 4.8.2 Setting Options

The following figure shows the available specific settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Settings – Switch behaviour/Control behaviour | | |
| Switch constant light via ... | ■ external object<br>■ **Presence (light channel 1)** | Definition of how the control should be switched on. |
| Time from switching on to start of control | 1 s – 5 min<br>**[5 s]** | Delay between activation and start of control. |
| Controller switches the light Off | ■ **not active**<br>■ active | Definition of whether the controller may switch the light off completely. |
| Minimum dimming value at dimming output | 0 – 50 %<br>**[0 %]** | Setting the minimum dimming value for the constant light control |
| Maximum dimming value at dimming output | 50 – 100 %<br>**[100 %]** | Setting the minimum dimming value for the constant light control |
| Switch-on value “Day” | ■ parameter (settable dimming value)<br>■ Teach-in (taught-in dimming value)<br>■ **calculate switch-on value (via lux value)** | Definition of the value with which the control should be switched on in day mode. |
| Dimming value at switch-on “Day” | 0 – 100 %<br>**[80 %]** | Defines the “Day” switch-on value.<br>**Only with „parameter (settable dimming value)“.** |
| Preset setpoint at “Day” | 100 – 750 Lux<br>**[450 Lux]** | Setpoint for day mode.<br>**Only with “Calculate switch-on value”.** |
| Constant light control at “Night” | ■ **not active**<br>■ active | Activation of the control in night mode. |
| Switch-on value “Night” | ■ **parameter (settable dimming value)**<br>■ Teach-in (taught-in dimming value)<br>■ calculate switch-on value (via lux value) | Definition of the value with which the control should be switched on in night mode. |
| Dimming value at switch-on “Night” | 0 – 100 %<br>**[20 %]** | Defines the “Night” switch-on value.<br>**When „Constant light control at Night“ is not active. If active, with „parameter (settable dimming value)”.** |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Preset setpoint at "Night" | 25 – 500 Lux<br>**[50 Lux]** | Setpoint for night mode. |
| Brightness value at switch-on | ■ use last dimming setpoint<br>■ **use parameter value** | Setting which brightness value should be used when switching on. |
| CL status sends value 1 | ■ on readiness<br>■ **when control active**<br>■ when lock active | Setting for which action the status of the Constant light is sent. |
| Settings – Dimming behaviour | | |
| Send dimming value cyclically | **not active**<br>5 s – 10 min | Setting whether and in which cycle the dimming value should be sent. |
| Send dimming value on change of | 0,5 – 5 %<br>**[0,5 %]** | Definition of the change at which the dimming value is sent. |
| Behaviour of CL on relative dimming | ■ **use new dimming value**<br>■ switch off control | Setting how the control should behave with relative dimming. |
| Time for relative dim-ming | 5 s – 60 min<br>**[20 s]** | Setting the time for relative dimming from 0 % to 100 % or from 100 % to 0 %. |
| Settings – Standby/Orientation light | | |
| Standby/Orientation light | ■ **not active**<br>■ active | Setting whether the light should continue to run after the end of control. |
| Standby setpoint | 5 – 100 %<br>**[50 %]** | Definition of the value for standby mode. |
| Standby time | 5 s – 60 min<br>**[10 s]** | Setting the time for standby mode. |
| Settings – Lock object | | |
| Lock object | ■ **not active**<br>■ active | Activation of a lock object. |
| Lock object value = 1 | ■ OFF<br>■ **ON (100%)**<br>■ no change (hold value)<br>■ settable value | Settings what should happen when the lock object is activated |
| Value | 0 – 100 %<br>**[0 %]** | Setting the value while the lock is active.<br>**Only with "settable value"..** |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Lock object value = 0 | ■ OFF<br>■ ON (100%)<br>■ no change (hold value)<br>■ **restore previous state** | Setting the action to be performed when the lock object is deactivated. |
| Settings – Scenes | | |
| Scenes | ■ **not active**<br>■ active | Setting whether scenes are to be used for constant light control. |
| Behaviour at setting of scene | ■ switch ON<br>■ **sets only switch-on value** | Setting the behaviour when activating the scenes. |
| Scenes learning mode | ■ **not active**<br>■ active | Setting whether scenes are saved when they are changed. |
| Scene 1 - 8 | 25 – 750 Lux<br>**[Default value varies per scene]** | Adjustable values for the different scenes. |

Table 115: Settings – Constant light control

**Settings – Switch behaviour/Control behaviour**
The general settings for the constant light control are made here.
The parameter "**Switch constant light via...**" can be used to set whether the control is switched via the detected presence or via an external object, which can be connected to a push-button, for example.
The parameter "**Controller switches the light off**" defines whether the controller may regulate the light to 0 %, e.g. in the case of strong sunlight, and is thus switched off. If the parameter is set to "not active", the outputs are not set to 0 % but maintain a minimum value that prevents the lamps from being switched off. This setting is useful in offices/workrooms, as switching off the lighting is usually perceived as annoying. Furthermore, the dimming range (minimum and maximum dimming value) for the CL can be limited.
The "**Switch-on value Day/Night**" parameter can be used to specify to the presence detector the value with which the control is to be initialised. It is possible to define a fixed value, to use the value adjusted during the Teach-in procedure or to have the switch-on value calculated directly internally. The time until the control starts after switching on can also be defined.
The parameter "**Brightness value at switch-on**" defines whether the control should always work with the configured value or whether it should use the last setpoint value that was read in, for example, via absolute/relative dimming or the scene function.
The control can also be configured here for different values for Day and Night. Day is active as soon as the CL has been activated, "**Constant light control at Night**" can be additionally activated via parameters. If not active, a fixed dimming value is set for switching on.
With the parameter "**CL status sends value 1**", it is possible to receive information about the current status (standby, control active or lock active) via an object.

**Settings – Dimming behaviour**
The dimming value can be passed on both cyclically and at a specific percentage change.
The parameter "Behaviour of the CL on relative dimming" also defines whether the control should be switched off by manual relative dimming or should continue to operate with the new value.

**Settings – Standby/Orientation light**
To prevent the light from going out after switching off the constant light control, it is possible to keep the light on for a certain time with a set dimming value using a “standby/orientation light”.

**Settings – Lock object**
When activated by a “1”, a lock object is displayed that locks the constant light control and causes a certain forced position.
With the withdrawal of the lock by a “0”, a defined action can also be configured

**Settings – Scenes**
Different brightness setpoint values can be set via up to 8 scenes. This means that the brightness value of the control for a room can be changed with a simple key press. It is also possible to set whether triggering the scene switches the constant light control on directly or only the new value is set. It is also possible to accept a changed scene value.

The following table shows the relevant communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 246 | Constant light – Switch | 1 Bit | Activating/deactivating the control |
| 247 | Constant light – Dimming relative | 4 Bit | Manual adjustment of the current brightness |
| 248 | Constant light – Dimming absolute | 1 Byte | Adjusting the current brightness to a new absolute value |
| 250 | Constant light – Lock | 1 Bit | Locking the control |
| 251 | Constant light – Scenes | 1 Bit | Controlling scenes |
| 252 | Constant light – Dimming absolute output main | 1 Byte | Output for middle group |
| 253 | Constant light – Dimming absolute output wall | 1 Byte | Output for wall group |
| 254 | Constant light – Dimming absolute output window | 1 Byte | Output for window group |
| 255 | Constant light – Status | 1 Bit | Sending the current status |

Table 116: Communication objects – Constant light control

## 4.9 Logic

### 4.9.1 Activation of the logic function

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Logic function 1 - 4 | ■ **not active**<br>■ active | Activation of the respective logic function. |
| Request inputs after bus voltage return | ■ **not active**<br>■ active | Setting whether the inputs should be actively requested after bus voltage recovery. |

**Table 117: Settings –Activation of the logic function**

A separate menu is displayed for each activated logic function, where the function can then be configured individually.

### 4.9.2 Logic settings

There are 2 text fields available:

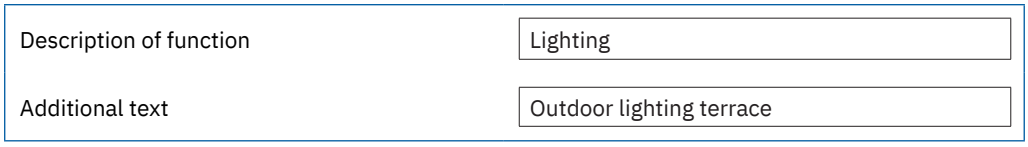


**Figure 16: Text fields – Description and additional text**

Texts with up to 40 characters can be stored for both fields.
The text entered for the "**Description of function**" appears in the menu behind the corresponding logic as well as with the communication objects of the logic.

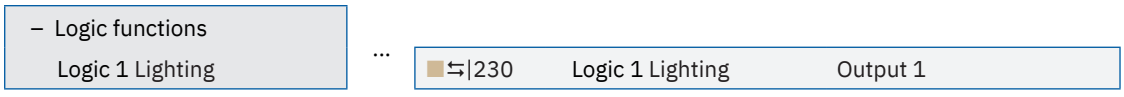


**Figure 17: Presentation of the description**

The "**Additional text**" is merely additional information to the logic. This is not visible anywhere else.

Up to 4 different logic functions can be implemented. JEach logic function can link and evaluate up to 2 internal objects and up to 4 external objects. The sending behaviour of the output can be adjusted via the sending condition.

The following table shows the available settings:

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Function | ■ **AND**<br>■ OR<br>■ XOR | Setting of the logic function |
| Output object | ■ **Switch**<br>■ Scene<br>■ Value<br>■ Forced guidance 2 Bit | Setting the output object for the logic |
| Settings for output object “Switch” | | |
| Sending condition | ■ on input telegram<br>■ **on change of output**<br>■ send only “0” on change of output<br>■ send only “1” on change of output<br>■ send only “0” on input telegram<br>■ send only “1” on input telegram | Setting the condition according to which the output should send. |
| Output | ■ **normal**<br>■ inverted | Defines how the output object is sent. |
| Settings for output object „Scene“ | | |
| Sending condition | ■ on input telegram<br>■ **on change of output**<br>■ send only scene for “False” on change of output<br>■ send only scene for “True” on change of output<br>■ send only scene for “False” on input telegram<br>■ send only scene for “True” on input telegram | Setting the condition according to which the output should send. |
| Scene number for output value “False/True” | **not active**<br>1 – 64 | Setting the scene to be sent.<br>**Only for output object “Scene”.** |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| **Settings for output object „Value“** | | |
| Sending condition | ■ on input telegram<br>■ **on change of output**<br>■ send only value for “False” on change of output<br>■ send only value for “True” on change of output<br>■ send only value for “False” on input telegram<br>■ send only value for “True” on input telegram | Setting the condition according to which the output should send. |
| Datapoint type | ■ **1 Byte DPT 5.005 Decimal (0...255)**<br>■ 1 Byte DPT 5.001 Percent (0...100 %) | Setting the DPT for value to be sent. |
| Percent value for output value “False/True” | 0 – 100 %<br>**[0 %]** | Setting the value to be sent.<br>**Only with DPT „5.001 Percent“.** |
| Value for output value “False/True” | 0 – 255<br>**[0]** | Setting the value to be sent.<br>**Only with DPT „5.001 Decimal“.** |
| **Settings for output object „Forced guidance 2 Bit“.** | | |
| Sending condition | ■ on input telegram<br>■ **on change of output**<br>■ send only value for “False” on change of output<br>■ send only value for “True” on change of output<br>■ send only value for “False” on input telegram<br>■ send only value for “True” on input telegram | Setting the condition according to which the output should send. |
| Forced guidance for output value “False/True” | ■ **00 - no priority, Off**<br>■ 01 - no priority, On<br>■ 10 - priority, Off<br>■ 11 - priority, On | Setting the value to be sent. |
| **Settings: Inputs** | | |
| Internal Input A/B | ■ **not active**<br>■ normal<br>■ inverted | Activation of an internal object as a logic input and setting whether it should be used normally or inverted. |

| ETS Text | Dynamic range<br>**[Default value]** | Comment |
|---|---|---|
| Object number | 0 – 239<br>**[0]** | Selection of the internal object that is active as an input for the logic. |
| External Input C-F | ■ **not active**<br>■ normal<br>■ inverted | Activation of an external object as a logic input and setting whether it should be used normally or inverted. |
| Preset logic input after reset with | ■ **value 0**<br>■ value 1 | Setting the value with which an input is to be pre-assigned after bus voltage recovery. |

Table 118: Settings – Logic

The "**Sending conditions**" are explained as follows (the texts vary depending on the source object):

- **on input telegram:** The output value is sent with every input telegram, regardless of whether the output value has changed or not.
- **on change of output:** The output value is only sent if the output has changed.
- **send only „0/1" / „Value/Scene for False/True" on change of output:** The output value is only sent if the output changes and the logic has the corresponding value (0/1).
- **send only „0/1" / „Value/Scene for False/True" on on input telegram:** Output value is sent with every input telegram and the logic has the corresponding value (0/1).

Internal inputs can be connected to all existing objects on the device.
**Important:** Only Bit values can be evaluated correctly.

**External inputs** can only be linked with 1 Bit objects.
**Note:** In the event of a reset (bus voltage failure/recovery), the external inputs are in an undefined state. In this case, the inputs can be pre-assigned with values (1/0) in order to maintain the function of the logic. These values refer up to valid values from the external objects (e.g. status messages).

The following table shows the associated communication objects:

| Number | Name / Object function | Length | Usage |
|---|---|---|---|
| 226 | Logic 1 – Input C | 1 Bit | External input for the logic function |
| 227 | Logic 1 – Input D | 1 Bit | External input for the logic function |
| 228 | Logic 1 – Input E | 1 Bit | External input for the logic function |
| 229 | Logic 1 – Input F | 1 Bit | External input for the logic function |
| 230 | Logic 1 – Output 1 | | Output of the logic function.<br>DPT depending on the output object parameter |

Table 119: Communication objects – Logic

# 5 Index

## 5.1 Register of illustrations

## 5.2 List of tables

# 6 Appendix

## 6.1 Statutory requirements

The devices described above must not be used in conjunction with devices which directly or indirectly serve human, health, or life-safety purposes. Furthermore, the devices described must not be used if their use may cause danger to people, animals, or property.
Do not leave the packaging material carelessly lying around. Plastic foils/ bags etc. can become a dangerous toy for children.

## 6.2 Disposal

Do not dispose of the old devices in the household waste. The device contains electrical components that must be disposed of as electronic waste. The housing is made of recyclable plastic.

## 6.3 Assembly

**Danger to life from electric current!**

The device may only be installed and connected by qualified electricians. Observe the country-specific regulations and the applicable KNX guidelines

The devices are approved for operation in the European Union and in the United Kingdom. The products are respectively marked with the CE and UKCA symbols.

Use in the USA and Canada is prohibited!

## 6.4 History

| | | |
|---|---|---|
| V1.0 | First Version of Technical Manual | DB V1.0 06/2024 |