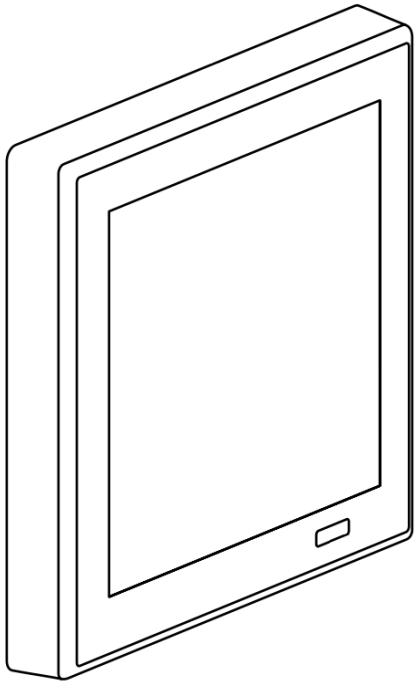
Product documentation

KNX room controller LS TOUCH

Ref.-no.: L ... 459 D 1S .., ... 459 D 1S ..
L ... Z 459 BF D 1S .., L ... Z ... 459 BF D 1S ..
LC 459 D 1S ..



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1. Information on the Product

1.1 Product Catalogue

Product name	Design range	Reference number	Type	Design style
KNX room controller LS Touch	LS 990	L .. 459 D 1S ..	Sensor	flush-mounted
KNX room controller LS Touch	LS 990 in metal	.. 459 D 1S ..	Sensor	flush-mounted
KNX room controller LS Touch	LS ZERO	L .. Z 459 BF D 1S ..	Sensor	flush-mounted
KNX room controller LS Touch	LS ZERO in metal	L .. Z .. 459 BF D 1S ..	Sensor	flush-mounted
KNX room controller LS Touch	LS 990 Les Couleurs® Le Corbusier	LC 459 D 1S ..	Sensor	flush-mounted

1.2 System information

The device can be updated. Firmware can be easily updated.
The device is KNX Data Secure capable. KNX Data Secure offers protection against manipulation in building automation and can be configured in the ETS project. Detailed specialist knowledge is required. A device certificate, which is attached to the device, is required for safe commissioning. During mounting, the certificate must be removed from the device and stored securely.
Planning, installation and commissioning of the device are carried out with the aid of the ETS, version 5.7.4 and above.

2. Function

2.1 Intended use

- Operating electrical loads (light switching, dimming, controlling blinds/shutters etc.)
- Displaying the status of systems and information (e.g. temperature and brightness)
- Measurement and feedback control of the room temperature
- Installation in flush box with dimensions according to DIN 49073
- Recommended mounting height is 1.50 m

2.2 Product characteristics

- Height above surface: 12 mm
- With integrated 1-gang frame of the LS 990 or LS ZERO design range.
  Not suitable for other design ranges or multiple combinations.
- High-resolution IPS display
- capacitive touch screen
- Max. 32 KNX operating functions (switching, dimming, controlling blinds, value transmitter, calling up moods, music etc.)
- Integrated room temperature sensor
- Room temperature control with setpoint value specification
- Alarm function (optical and optionally acoustic)
- Max. 8 timer functions (depending on time, astronomical clock or random)
- Integrated proximity and brightness sensor
- Integrated bus coupling unit
- Connection of installation buttons or reed contacts possible
- Commissioning and support of KNX Data Secure with ETS from version 5.7.4

2.3 Technical data

Screen diagonal:	86 mm / 3.4“
KNX	
KNX medium	TP256
Security	X-mode
Commissioning mode	S-mode
Rated voltage	DC 21 ... 32 V SELV
Current consumption KNX	60 mA
Connection KNX	Connection terminal
Connection cable KNX	EIB-Y (St)Y 2 x 2 x 0.8
Protection class	III
Connecting external switching contacts	
Number	max. 20
Cable type	J-Y(St)Y 2 x 2 x 0.8
Cable length	max. 25 m
Ambient conditions	
Ambient temperature	−5 ... +45 °C
Storage / transport temperature	−25 ... +70 °C
Relative humidity	30 % ... 70 %

3. Safety instructions and device components

3.1 Safety instructions

Electrical devices may only be mounted and connected by electrically skilled persons.
Serious injuries, fire or property damage possible.
Please read and follow manual fully.
Danger of electric shock. During installation and cable routing, comply with the regulations and standards which apply for SELV circuits.

3.2 Device components

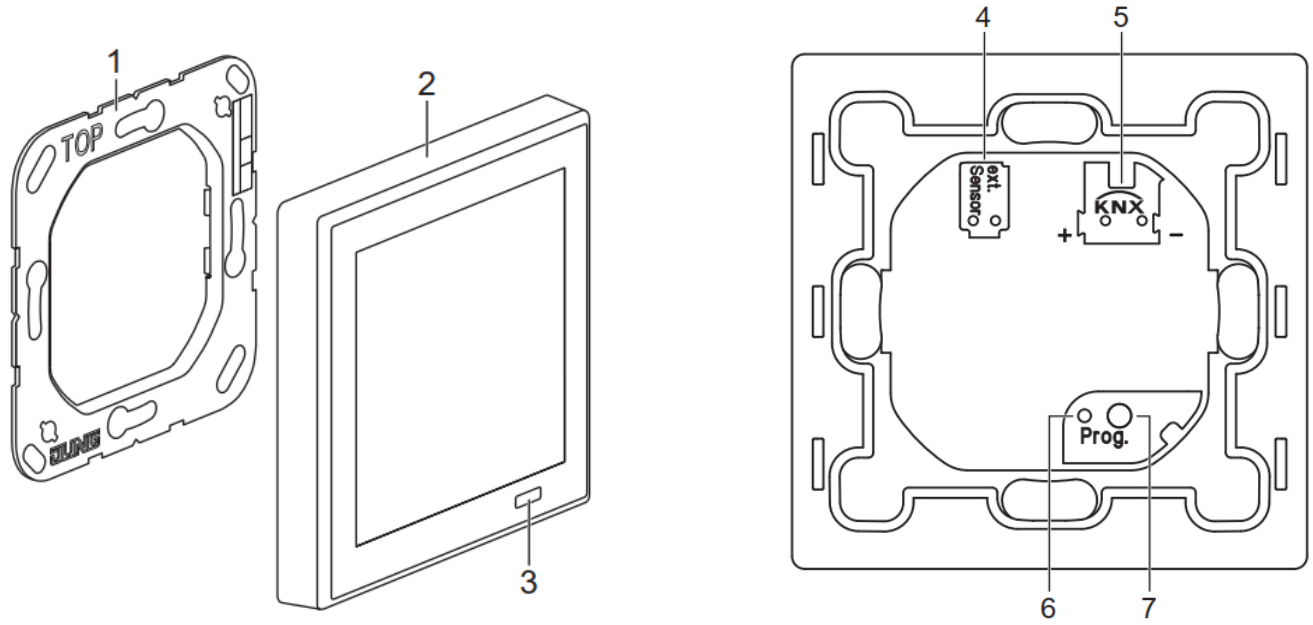


Fig. 1: Device components

(1) Supporting frame
(2) LS TOUCH with integrated frame (LS 990)
(3) Proximity sensor
(4) External sensor connection (optional)
(5) KNX connection
(6) Prog. LED
(7) Prog. button

4. Installation and electrical connection

DANGER
Electrical shock on contact with live parts in the installation environment.
Electrical shocks can be fatal.
Before working on the device, disconnect the power and cover live parts in the area!

Do not mount near sources of interference such as electric cookers, refrigerators, draughts or direct sunlight. This influences the temperature measurement of the controller.

4.1 Mounting the supporting frame and connecting the device

- Mount the supporting frame (1) on an appliance box.
  Note marking "Top".
  Use the box screws included in delivery.
- Connect the KNX (5).
- Optionally, connect the external sensor (4).

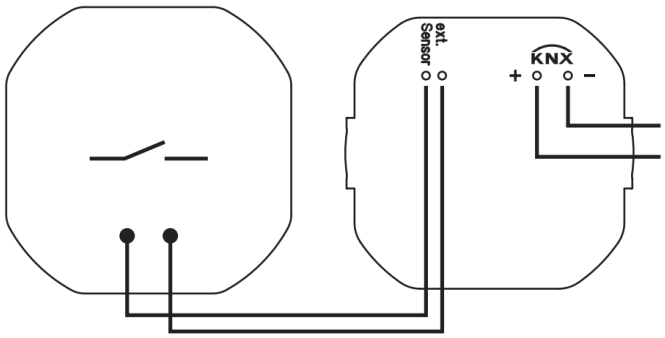


Fig. 2: Connecting the device

4.2 Connecting the external sensor

Only one of the following sensors can be connected:
– external temperature sensor (ref. no.: FF NTC)
– external switching contacts (e.g. installation buttons or reed contacts)
Observe the technical data:
– cable type (J-Y(St)Y 2×2×0.8)
– permissible cable length (max. 25 m)
– number of external switching contacts (max. 20 in parallel or series connection)
  Do not connect any external voltage.

4.3 Fitting the device

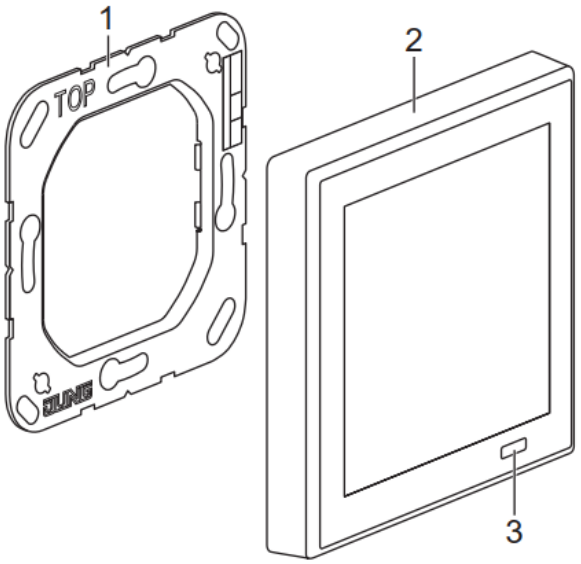


Fig. 3: Device components

- Attach the device (2) to the supporting frame.

4.4 Dismantling the device

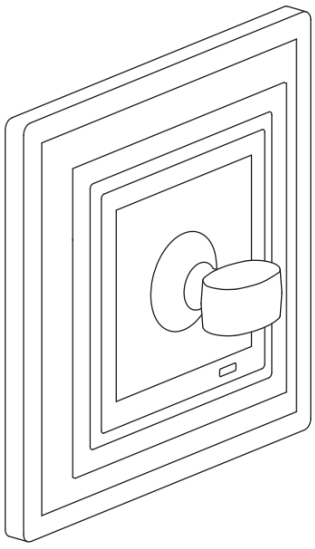


Fig. 4: Dismantling the device

The frame of the device is integrated. The device cannot be removed from the frame.

- Carefully detach the entire device from the supporting frame.
  For this purpose, use the suction lifter (ref.-no.: W-HEBER) included with LS ZERO.

5. Commissioning

After connecting, the device is switched on automatically.
After switching on, the demo mode is displayed if the device has not yet been programmed. In demo mode, communication with the KNX system is not possible. After loading the ETS software, the device is in demo mode.

In demo mode, the settings on the touch display are password-protected. The password is "0000".

5.1 KNX Data Secure

Requirements:
– Safe commissioning is activated in the ETS.
– FDSK entered/scanned or device certificate added.
ⓘ The device certificate (QR code) is found in the form of a sticker on the back of the device or under Settings/Information on the display.
ⓘ Document all passwords and store them securely.

5.2 LED display

Prog. LED (6) lights up red: Programming mode is activated.

5.3 Programming the device

- Press the Prog. button (7).
  Activate the programming mode in the "Settings" menu: Main menu → Settings → KNX programming mode Prog. LED lights up.
- Load physical address into the device.
  The programming mode is terminated.
  Prog. LED goes out.

6. Resetting to factory settings

6.1 Master reset

The master reset resets the device to the default settings (physical address 15.15.255, firmware is retained). Demo mode is displayed and the device must then be recommissioned with the ETS.

In secure mode: A master reset deactivates the device security. The device can then be recommissioned with the device certificate.

6.2 Performing master reset

Make sure that the device is switched off (Disconnect KNX bus voltage).
- Press PROG button, hold it and connect the KNX bus voltage.
  Device switches on.
- Hold PROG button until PROG LED flashes slowly (approx. 1 Hz).
- Release PROG button.
- Press PROG button again and hold it until PROG LED flashes fast.
  (approx. 4 Hz). The master reset is carried out.
- The PROG button can be released now.

7. Range of functions

7.1 General

The KNX room controller LS Touch is a room control device in the LS990 switch range with integrated temperature detection and control.
The high-resolution touch IPS display provides an interface with which the user can operate and visualise all functions of the LS Touch.

7.2 Display – Proximity sensor – Brightness sensor

A colour scheme (skin) for the foreground and background colour/lighting can be selected via the ETS parameters to match the design frame.
Among other things, the matching colour scheme is available for all 63 Le Corbusier colours. The device is ordered with a matching design frame. In addition, a custom colour scheme can be compiled if required**.**

Screen saver and standby can be enabled by parameters or via the touch display, regardless of the time of day or only in a parameterisable time period.

If the proximity sensor is activated, the standby operation or screen saver can be interrupted upon approaching and the first favourites page can be called up automatically. In case of inactivity (no touch operation), a screen saver can be activated after a parameterisable time (run-on time) and for a parameterisable time if required. On request (parameter setting), the device can switch from the screen saver to standby mode (display switches off) after exceeding this period of inactivity. The run-on times for the screen saver and the standby mode as well as the information displayed when the screen saver is activated can be adjusted at any time via the ETS parameters or via the settings on the display. Overwriting during the ETS download of the values selected via the touch display can be excluded using a parameter.

If necessary, the brightness sensor dynamically adjusts the backlight of the display, depending on the measured brightness in the room. The automatic brightness control can be activated or deactivated at any time via the ETS or via the settings on the display. Alternatively, the brightness is adjusted via the bus system. Overwriting during the ETS download of the values selected via the touch display can be excluded using a parameter.

7.3 Favourites – Menu – Areas

Up to three favourites pages offer the possibility to highlight, group and prioritise up to 12 functions and to use them directly and quickly. The design of the favourites pages can be set in advance in the ETS application and the user can change this at any time via the settings on the display. Overwriting during the ETS download of the values selected via the touch display can be excluded using a parameter.

The menu page provides access to the six areas, the cleaning mode, the weekly timer (switching times) and the settings.

Up to 6 areas give the user access to a maximum of 32 functions, the internal temperature controller, up to 4 controller extensions, the information display and the multimedia page.

7.4 Channel functions

Up to 32 channel functions are available, which can be operated via the touch display and whose status is shown via the display.
Each function created has its own detail page for operation. In addition, one to four functions can be grouped together per favourites page.
With up to 3 favourites pages, up to 12 functions are directly accessible to the user for fast, direct operation without having to open the detail pages.
The following function types can be created and configured via the ETS application:

- Switching
- Dimming
- Dimming Tunable White
- Dimming RGB
- Shutter / Awning / Blind
- Value transmitter
- Scene extension

The user can open channel functions via an area page as a detail page. Additionally, he can assign them to a favourites page.

7.5 Information display

The information display is a dedicated display page in the LS Touch, with which information (designation, display value and device) transmitted via the KNX bus system is displayed in list form over 6 lines, e.g. wind strength from the weather station or consumption values from the energy detectors or analogue interface.
The user can open this page via an area page.

7.6 Alarm messages and warnings

Up to 6 alarm messages or warnings can be created in the ETS application. When activated, an alarm page can be displayed automatically with or without an acoustic signal (pop-up display), or only a warning is recorded (entered) in the message list, which the user can open via the settings on the display.
The user can open this page via an area page in the "Settings" page.

7.7 Integrated room thermostat

The room temperature to be controlled for the integrated room thermostat is derived from the "Temperature measurement" parameterisation.
The detail page for operating the integrated room thermostat is accessed / selected via one of the six area pages or the three favourites pages.
Different operating modes (comfort, standby, night and frost / heat protection) can be activated via the touch display or KNX communication objects (e.g. via the controller extension). In addition to operation, the display shows the status and value of the settings as feedback on the "Room thermostat" detail page.

Each operating mode can be assigned its own temperature setpoint values (for heating and / or cooling).
For this, the basic setpoint value is set in the ETS parameterisation as the comfort temperature setpoint value for the "heating only" or "cooling only" function.
When combined in the "Heating + cooling" function, the dead zone value must be taken into account.
Comfort temperature setpoint value (heating) = basic setpoint value – dead zone value
Comfort temperature setpoint (cooling) = basic setpoint value + dead zone value
The setpoint values for standby and night are specified in the ETS parameters relative to the comfort setpoint value in Kelvin. The heat / frost protection is specified as absolute setpoint values. This corresponds to the KNX conformity!

For the user, the LS Touch offers the convenience of making adjustments on the room thermostat detail page via the touch display in the respective operating mode in absolute, customary values / sizes in °C or to move them with the slider and to convert them internally in accordance with the KNX.

- The configuration of the temperature setpoint values for standby and night mode is relative. Derived from the basic setpoint value. It is set via the ETS software or via the detail page on the device.
- Switching of the operating modes by a 1-byte object.
- Frost / heat protection switchover by window status or by automatic frost protection.
- Displaying the room thermostat information via the detail page.
- "Heating", "Cooling", "Heating and cooling" operating modes
- Different control modes can be configured for each heating or cooling stage: PI control (continuous or switching PWM) or 2-point control (switching).
- Control parameters for PI controller (if desired: proportional range, reset time) and 2-point controller (hysteresis) adjustable.
- Automatic or object-oriented switching between "heating" and "cooling".
- Setpoint adjustment with relative setpoint specification possible temporarily or permanently by operation via the detail page on the device or via communication objects.
- Control of an external fan via automatic or manual fan control possible.
- Status feedback (also KNX compliant).
- Deactivation of the control possible via separate 1-bit objects.
- Internal and external temperature sensor for room temperature measurement possible.
- Measured value formation parameterisable from internal to external sensor for room temperature measurement. Querying time of the external temperature sensor adjustable.
- The room temperature measurement (actual value) can be adjusted separately for the internal and external sensor.
- The actual and set temperatures can be output to the bus (also cyclically) after a parameterisable deviation.
- Separate control value output in heating and cooling mode. This results in two control value objects per stage.
- Normal or inverted control value output can be parameterised.
- Automatic transmission and cycle time for control value output can be parameterised.
- Set temperature limitation possible. If necessary, the controller limits the set temperature to specific values and prevents adjustment outside the legally stipulated limits.

7.8 Integrated controller extension

In addition to the function of the internal room thermostat (1 controller), four additional controller extensions are available for controlling external room thermostats. Controller extensions are useful and necessary for display and adjustment when using controllers in heating actuators / valve drives or for display and adjustment of controllers that operate in other rooms.

- Full control of the controller (operating modes and setpoint adjustment).
- Full display of the controller status (control value for heating / cooling, setpoint adjustment, room temperature, set temperature and current operating mode).

7.9 Multimedia

A predefined multimedia page is available for convenient operation of a music zone. The favourites page can be used to start or stop the music system and to select the next or previous music track. The detail page displays the artist, title and playlist in text format and allows the volume to be adjusted.

A prerequisite for this function is a link between the KNX and music system. The JUNG Smart Visu Server provides the connection to the music system as an interface to Sonos.

7.10 Integrated Astro weekly timer

The integrated weekly timer is an 8-channel weekly timer with up to 4 switching times, each with selectable Astro or random function. For example, shutters can open or close in a parameterisable time interval depending on the season. Alternatively, random functions can also be parameterised.
Up to eight timer switch channels can each be assigned one of the created channel functions, the internal temperature controller, the controller extensions or the multimedia function via jump targets.

In addition to configuration via the ETS application, the user can create and change timer switch channels and switching times or adjust assigned functions at any time via the touch display.

The user can parameterise whether the settings of the weekly timer made via the touch display are overwritten by the values parameterised by the ETS with the ETS programming procedure.

Note:
Activation and value specifications of the switching times are made via the touch display.

7.11 Password protection

The LS Touch can be password protected with a 4-digit number combination. Password protection can be set up hierarchically via ETS parameters and on the touch display. In this way, the device can be protected in its entirety or only individual pages can be protected when called up.
The user can choose to protect the entire device (restart / screen saver / standby) or specific pages (areas, menu page, settings or weekly timer). In addition to the configuration in the ETS application, the user can change the password protection via the settings on the display.

The user can parameterise whether the password settings made via the touch display are overwritten by the values parameterised by the ETS with the ETS programming procedure.

7.12 Logic functions

The device has up to 8 internal logic functions whose inputs and outputs are mapped via communication objects and thus act as KNX telegrams on other KNX devices and can also be used internally, connected to communication objects of the LS Touch.

The following logic function types can be selected:
- Logic gate (e.g. AND, OR, exclusive OR, each with up to 4 inputs)
- 1-bit-to-1-byte converter with input filter, disabling object and specification of the output values
- Disabling element with filter and time functions and disabling object
- Comparator for values with 9 different input data formats and many comparative operations
- Limit switch with hysteresis with upper and lower threshold at 9 different input data formats, incl. specification of the 1-bit output values

The logic functions have their own KNX communication objects and can process telegrams from the LS Touch or other bus devices.

Outputs can send KNX telegrams cyclically, upon receiving an input telegram or upon changes to the output value. This enables a monitoring function, a reduction in the number of telegrams or a diagnosis of the linked events.

8. Operation

8.1 Touch sensitive surface

Touch the screen surface with your finger only. Do not operate the touch screen with sharp or pointed objects.

8.2 Menu structure

Screen saver → Favourites

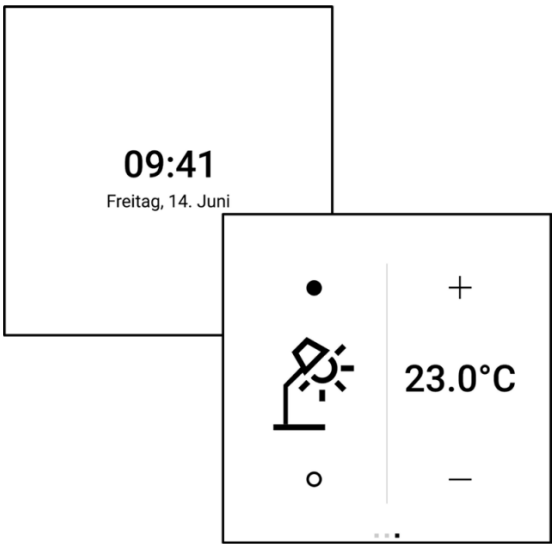


Fig. 5: Menu structure

Main menu → Area → Function

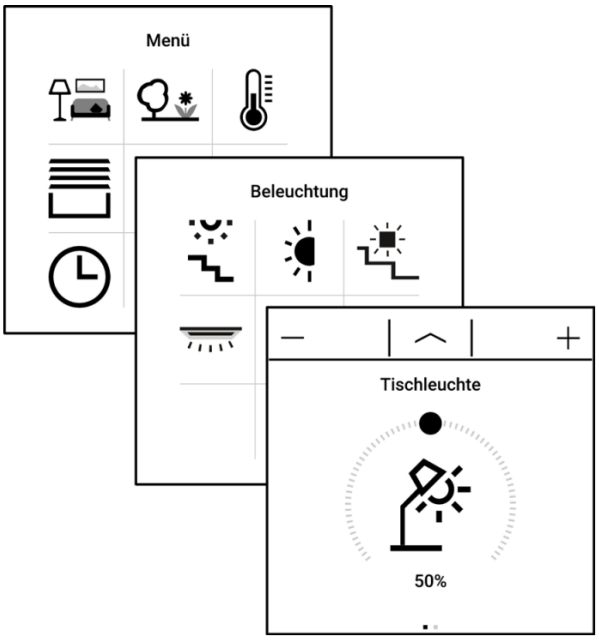


Fig. 6: Menu structure

8.3 Screen saver

The screen saver is automatically hidden when the proximity sensor is activated. After hiding, the favourites are displayed.
If there is no activity, the screen saver is automatically displayed again.

8.4 Displaying menus

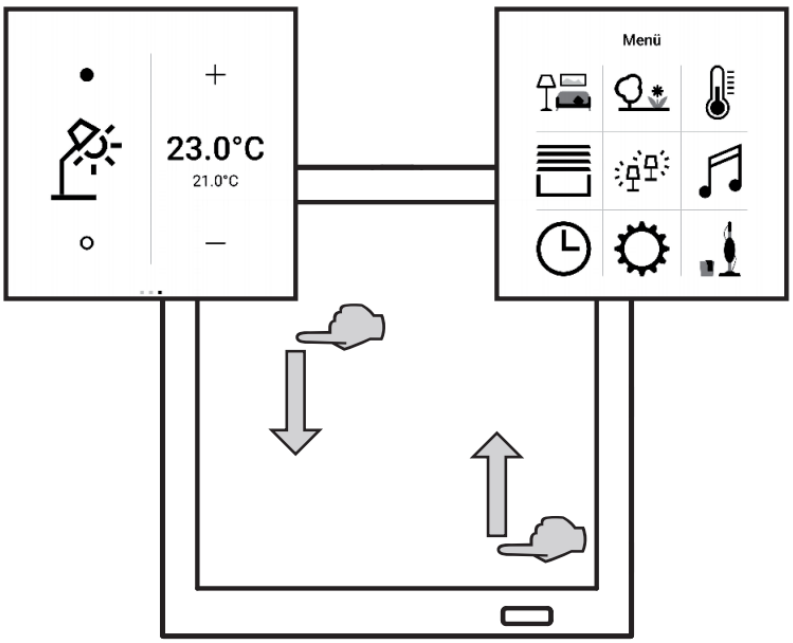


Fig. 7: Displaying menus

Favourites:
- Perform a swiping motion from top to bottom.

Main menu:
- Perform a swiping motion from bottom to top.

ⓘ The favourites and the main menu can be displayed directly from all menus.

8.5 Displaying area

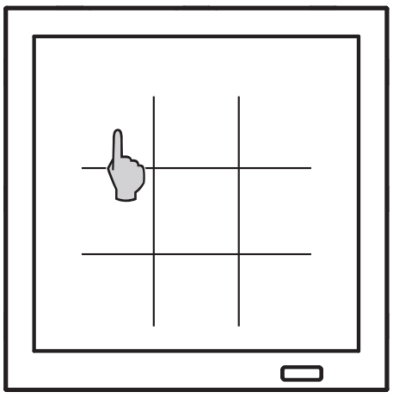


Fig. 8: Displaying area / function

- Select the area icon in the main menu.

8.6 Displaying function

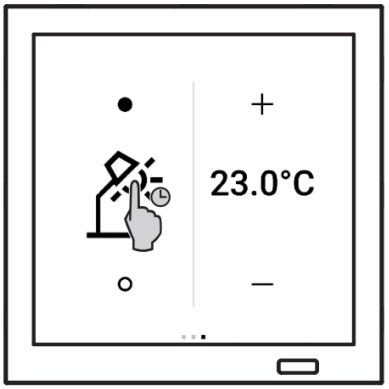


Fig. 9: Displaying function

- Select the function icon (fig. 9) in the respective area or tap and hold it in the favourites (fig. 10).

8.7 Scrolling through pages

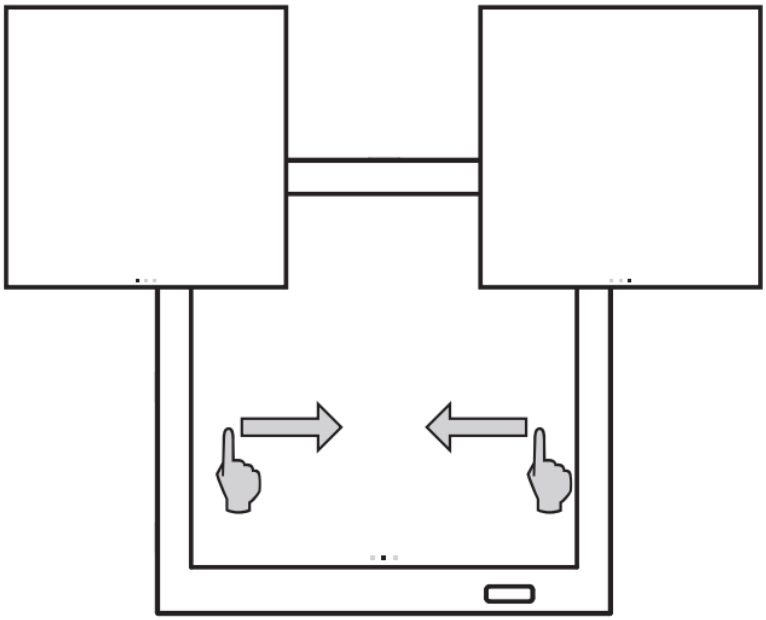


Fig. 10: Scrolling through pages

- Perform a swiping motion to the left or right. Alternatively, tap on the squares.

8.9 Adjusting the functions

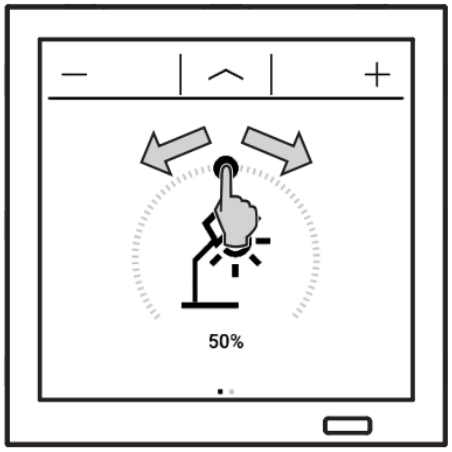


Fig. 11: Adjusting the functions

The adjustment options for the functions depend on the function type.
Example:
Adjusting the brightness/dimming the light:
- Adjust the brightness using the slider or the plus / minus sign.

More information on how to operate the device can be found in the tutorials on our website.

9. General settings

Under "General" in the ETS application, the date and time are set in addition to the device language. The device can function as a slave or master for time and date.
In the "Slave" operating mode, the device queries the time and date via the bus when the system is started.
In the "Master" operating mode, the time / date must be specified after the system start by means of the ETS group monitor. Subsequently, slaves can request the time / date from the master. With an adjustable interval, the time is sent cyclically to the bus system.

The function of the input can be configured as a binary input or as an external temperature sensor.

Furthermore, additional functions are released under "General settings". By default, the screen saver, proximity sensor, temperature measurement and temperature control are activated. Depending on the requirements, the following functions can be enabled and further configured:

- Tones (can also be activated via the settings on the device)
- Password protection (can also be activated via the settings on the device)
- Multimedia
- Controller extensions
- Information display
- Warnings
- Logic functions

Depending on the activated function, additional menu items appear in the ETS application for further configuration.

9.1 Parameters

Device language	**German, English, Spanish, French, Russian, Dutch, Italian**
This parameter defines the display language of the text messages on the display specified by the manufacturer.	

Automatic daylight saving time adjustment	**Active, inactive**
At this point it is determined whether the device-internal system clock works with an automatic switchover from summer to winter time. If the parameter is deactivated, the time must be adjusted manually after a time change by transmitting to the time object.	

Time operating mode	Slave, master
Here you can select whether the device should set the time for the bus ("Master" parameterisation) or whether the time should only be received from the bus ("Slave" parameterisation). If the device is parameterised as a "Master", then the device can be used as a KNX clock for the bus. In this case, the device-internal system clock must be set via the objects "Date", "Time" or "Date / time" during commissioning. After that, the device has a valid time. As the device-internal system clock is buffered by an internal capacitor, the time is retained even in the event of a power failure for up to 2 hours. If an exact time is required over several months, it is recommended to synchronise the device-internal system clock at monthly intervals, as the internal system clock can deviate by up to 20 s per month from the actual time. Synchronisation must take place by transmission to the object "Time" or "Date / time". In master operating mode, the device can transmit the date and time on the bus using the "cyclical transmission" function. In addition, in this operating mode, the device reacts to incoming telegrams to the object "Request date / time" by transmitting the objects "Date", "Time" and "Date / time", provided the value from the parameter "Request date / time with" was transmitted in the object "Request date / time". If the device is parameterised as a "Slave", then the device acts as a timekeeper on the bus. The device-internal system time must be set via the objects "Date", "Time" or "Date / time", just as in master mode. To synchronise all devices on the bus, it is recommended that a KNX clock regularly (e.g. daily) sends a telegram with the current time on the bus to the "Time" or "Date / time" object. In addition, in this operating mode there is the option of the device sending the object "Request date / time" to the bus after a restart. For this purpose, the parameter "Request date / time after bus voltage return" must be activated.	

Request date / time with	"1" – telegram, "0" – telegram
In the event the time is requested, the telegram polarity of the request telegram can be configured at this point. This parameter is only visible if "Slave" is parameterised for "Time operating mode".	

Send time cyclically	1 min ... 1 h ... 24 h
At this point a time can be entered in either hours or minutes, which determines the transmission cycle for sending the objects "Date", "Time" and "Date / time". The transmission cycle starts after the device is restarted. If the time is set to 0, cyclical transmission is inactive. This parameter is only visible if "Master" is parameterised for "Time operating mode".	

Request date / time after bus voltage return	Active, inactive
The device has an internal system clock that is set by the objects "Date" and "Time" or the object "Date / time". If this parameter is activated, the device sends the "Request date / time" object with the value set under the "Request date / time with" parameter to the bus after a restart. A KNX clock can respond to this request by sending an object with the date and an object with the time or by sending the combined object "Date / time". If the device then receives the objects "Date" and "Time" or the object "Date / time", the internal system clock is set or synchronised. This parameter is only visible if "Slave" is parameterised for "Time operating mode".	

Function of the input	Not used, binary input, external temperature sensor
This parameter can be used to configure the function of the input terminal on the device. This can be used either as a binary input for a floating switching contact or for recording a temperature using the JUNG external temperature sensor. When parameterised as a "binary input", the triggering of a button or the status of window contacts can be monitored, for example. It is also permissible to establish a series or parallel connection of up to 20 switching contacts to the input. When parameterising as a binary input, the "Binary input switching" object and the "Binary input" tab are enabled in the ETS, which offers further parameterisations. When parameterising as an "external temperature sensor", an FF 7.8 JUNG external temperature sensor can be connected to the input terminal. This allows the room temperature to be determined more accurately. When parameterising as an external temperature sensor, further options are offered with the "Temperature detection by" parameter under the "Temperature measurement" tab.	

Screen saver	Active, inactive
This parameter enables the "Screen saver / standby" tab in the ETS parameter window and the object for "Disable screen saver / standby".	

Tones	Active, inactive
This parameter enables the "Tones" tab in the ETS parameter window.	

Proximity sensor	Active, inactive
This parameter enables the "Proximity sensor" tab in the ETS parameter window.	

Password protection	Active, inactive
This parameter enables the "Password protection" tab in the ETS parameter window.	

Multimedia	Active, inactive
This parameter enables the "Multimedia" tab in the ETS parameter window and the objects for the multimedia function.	

Temperature measurement	Active, inactive
This parameter enables the "Temperature measurement" tab and the "Room temperature control" parameter in the ETS parameter window. The room thermostat can only be used with active temperature measurement.	

Room temperature control	Active, inactive
This parameter enables the "Room temperature control" tab in the ETS parameter window.	

Controller extensions	Active, inactive
This parameter enables the "Controller extensions" tab in the ETS parameter window.	

Info	Active, inactive
This parameter enables the "Info" tab in the ETS parameter window.	

Timer switches	Active, inactive
This parameter enables the "Timer switches" tab in the ETS parameter window.	

Warnings	Active, inactive
This parameter enables the "Warnings" tab in the ETS parameter window.	

Logic functions	Active, inactive
This parameter enables the "Logic functions" tab in the ETS parameter window.	

9.2 Objects

9.2.1 Objects date / time – Slave operating mode

Object no.	Function	Name	Type	DPT	Flag
1	General – Output	Request date / time	1 bit	DPST-1-17	K, Ü, A
1-bit object to request time synchronisation. This object can optionally be used to control the request object of a KNX system clock. If the existing KNX clock supports this function, it sends a time telegram back to the device in response to the request, which ensures that a valid time is set immediately after a device reset.					

Object no.	Function	Name	Type	DPT	Flag
2	General – Input	Date	3 bytes	DPST-11-1	K, S, A
3-byte object for setting the date of the device-internal system clock. The system clock controls the date on the device display and the timer switch. The real-time clock has a calendar function. Depending on the date set, the internal calendar automatically determines the day of the week required for editing the timer switch. The last specification via the bus sets the system clock.					

Object no.	Function	Name	Type	DPT	Flag
3	General – Input	Time	3 bytes	DPST-10-1	K, S, A
3-byte object for setting the time of the device-internal system clock. The system clock controls the time on the device display and the timer switch. The real-time clock has a calendar function. Depending on the date set (see object 2), the internal calendar automatically determines the day of the week required for editing the timer switch. The day of the week transmitted in the KNX time telegram according to DPT 10.001 is irrelevant and is discarded by the device. The last specification via the bus sets the system clock.					

Object no.	Function	Name	Type	DPT	Flag
4	General – Input	Date/time	8 bytes	DPST-19-1	K, S, A
6-byte object for setting the date and time of the device-internal system clock. The system clock controls the date on the device display and the timer switch. The real-time clock has a calendar function. Depending on the date set, the internal calendar automatically determines the day of the week required for editing the timer switch. The last specification via the bus sets the system clock.					

9.2.2 Objects date / time – Master operating mode

Object no.	Function	Name	Type	DPT	Flag
1	General – Input	Request date / time	1 bit	DPST-1-17	K, S, A
1-bit object to request time synchronisation. When receiving the object with the value set in the parameter "Request date / time with", the device sends the objects "Date", "Time" and "Date / time" via the bus.					

Object no.	Function	Name	Type	DPT	Flag
2	General – Input / output	Date	3 bytes	DPST-11-1	K, S, Ü, A
3-byte object for sending the date with the value of the device-internal system time. This allows other bus participants to be synchronised as well. The user can write to this object and updates the system clock with this specification or initialises it during commissioning.					

Object no.	Function	Name	Type	DPT	Flag
3	General – Input / output	Time	3 bytes	DPST-10-1	K, S, Ü, A
3-byte object for sending the time with the value of the device-internal system time. This allows other bus participants to be synchronised as well. The user can write to this object and updates the system clock with this specification or initialises it during commissioning.					

Object no.	Function	Name	Type	DPT	Flag
4	General – Input / output	Date/time	8 bytes	DPST-19-1	K, S, Ü, A
6-byte object for sending the date and time with the value of the device-internal system time. This allows other bus participants to be synchronised as well. The user can write to this object and updates the system clock with this specification or initialises it during commissioning.					

9.2.3 Object binary input

Object no.	Function	Name	Type	DPT	Flag
8	Binary input – output	Switching	1 bit	DPT-1	K, Ü, A
Object for transmitting switching telegrams (ON, OFF). Depending on the parameterisation in the "Binary input" tab, a telegram can be triggered by actuating the switching contact. The transmitted value is also parameterised in the "Binary input" tab. This object is only available if the parameter "Function of the input" is set to "Binary input".					

9.3 Display

9.3.1 Brightness control

The brightness of the display can either be controlled automatically or specified via a communication object. The automatic brightness control can be activated or deactivated at any time via the settings on the device.

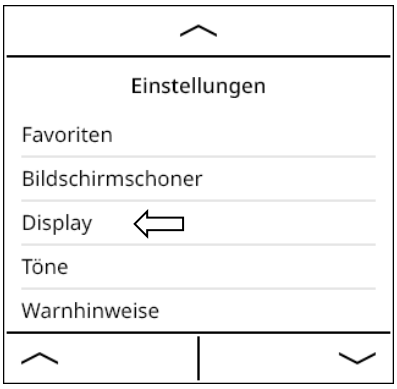


Fig. 12: Settings – Display selection

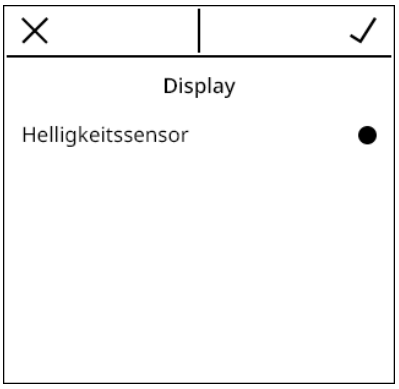


Fig. 13: Activating / deactivating brightness sensor

When the brightness control is switched off, the brightness is always 100 % after an application download or restart until a new value is received.

ⓘ Caution: The brightness can be set to 0 % via the bus, causing the display to be switched off. However, the touch control remains active!

9.3.2 Colour scheme

A colour scheme matching the design frame can be selected via the ETS parameters. For example, the matching colour scheme is available for all 63 Le Corbusier colours. The design frame on the device cannot be changed subsequently. Separate reference numbers are available for this purpose. If required, a custom colour scheme can also be compiled.

When a new colour scheme is transmitted, the device requires a longer start-up time to implement the colour change.
With predefined colour schemes, this increased start time is necessary for the first transmission. With user-defined colour schemes, the start-up behaviour is continuously increased after the application download.

9.3.3 Parameters

Automatic brightness control	**Active, inactive**
If active, the brightness of the display backlight is automatically adjusted according to the ambient brightness detected by the internal brightness sensor of the device. If this parameter is not active, the "Display brightness" object is enabled, with which the display brightness can be specified via the bus. The default value for the brightness is 100 % if no telegram has been received for the "Automatic brightness control" object and the automatic brightness control is deactivated.	

Overwriting automatic brightness control in the device during ETS programming process	**Active, inactive**
If this parameter is active, then the setting for the "Automatic brightness control" parameter made by the user via the "Brightness sensor" setting on the device will be overwritten during an ETS programming operation.	

Colour scheme	LS990 Les Couleurs® Le Corbusier, custom
Selection of the display colour scheme that sets the background and foreground colour (normal, highlighted and disabled). The user can choose between the colour scheme according to the JUNG standard colours of the LS series, the colour scheme according to Le Corbusier or a custom colour scheme with specifications for the individual colours as RGB values. After changing the colour and downloading the application to the device, all icons must be re-rendered once. This is indicated by the device on the touch display, the process takes about 45 seconds.	

Colour (LS990)	White (W), Alpine white (WW), Light grey (LG), Black (SW), Aluminium (AL), Stainless steel (ES), Anthracite (AL*AN), Dark (AL*D), Classic brass (ME*C), Antique brass (ME*AT)
Selection of the colour from the palette of standard colours of the LS series. This parameter is only visible with "Colour scheme" = "LS990".	

Colour (Les Couleurs® Le Corbusier)	blanc (32001), gris foncé 31 (32010), gris 31 (32011), gris moyen (32012), gris clair 31 (32013), bleu outremer 31 (32020), outremer moyen (32021), outremer clair (32022), outremer pâle (32023), outremer gris (32024), bleu céruléen 31 (32030), céruléen vif (32031), céruléen moyen (32032), céruléen clair (32033), céruléen pâle (32034), vert anglais (32040), vert anglais clair (32041), vert anglais pâle (32042), vert foncé (32050), vert 31 (32051), vert clair (32052), vert jaune clair (32053), ocre (32060), orange (32080), orange clair (32081), orange pâle (32082), rouge vermillon 31 (32090), rose pâle (32091), rouge carmin (32100), rouge rubia (32101), rose clair (32102), l'ocre rouge (32110), l'ocre rouge moyen (32111), l'ocre rouge clair (32112), terre sienne brûlée 31 (32120), terre sienne brique (32121), terre sienne claire 31 (32122), terre sienne pâle (32123), terre d'ombre brûlée 31 (32130), ombre brûlée claire (32131), ombre naturelle 31 (32140), ombre naturelle moyenne (32141), ombre naturelle claire (32142), rouge vermillon 59 (4320A), blanc ivoire (4320B), rose vif (4320C), terre sienne brûlée 59 (4320D), noir d'ivoire (4320E), vert olive vif (4320F), vert 59 (4320G), gris 59 (4320H), terre d'ombre brûlée 59 (4320J), bleu outremer 59 (4320K), ocre jaune clair (4320L), le rubis (4320M), bleu céruléen 59 (4320N), gris clair 59 (4320O), terre sienne claire 59 (4320P), ombre naturelle 59 (4320R), orange vif (4320S), bleu outremer foncé (4320T), gris foncé 59 (4320W), le jaune vif (4320U)
Selection of the colour from the Le Corbusier colour palette. This parameter is only visible with "Colour scheme" = "Les Couleurs® Le Corbusier".	

Background value	R: 0 ... 255 G: 0 ... 255 B: 0 ... 255
Selection of the background colour using an RGB value. This parameter is only visible with "Colour scheme" = "Individual".	

Foreground value	**R: 0 ... 255** **G: 0 ... 255** **B: 0 ... 255**
Selection of the foreground colour using an RGB value. This parameter is only visible with "Colour scheme" = "Individual".	

Foreground value (highlighted)	**R: 0 ... 64 ... 255** **G: 0 ... 85 ... 255** **B: 0 ... 250 ... 255**
Selection of the foreground colour (in highlighted state) using an RGB value. This parameter is only visible with "Colour scheme" = "Individual".	

Foreground value (deactivated)	**R: 0 ... 235 ... 255** **G: 0 ... 232 ... 255** **B: 0 ... 255**
Selection of the foreground colour (in deactivated state) using an RGB value. This parameter is only visible with "Colour scheme" = "Individual".	

9.3.4 Objects

Object no.	Function	Name	Type	DPT	Flag
6	General – Input	Display brightness	1 bytes	DPST-5-1	K, S, A
Object for setting the brightness of the backlight of the display. The decimal data values 0 ... 255 are evaluated as percentage values 0 ... 100 %. This object is only available if the "Automatic brightness control" parameter is deactivated.					

9.4 Screen saver / standby

The screen saver / standby mode is a two-stage display mode for the display.
After a phase of inactivity regarding operation, i.e. the user does not operate the display or is not in the detection range of the proximity sensor, the screen saver first becomes active.

After some time without operating the proximity sensor, the display switches to standby mode, i.e. the backlight is switched off completely.

The properties set in the ETS application for the screen saver and standby mode can be changed on the device. If the previously made setting is not to be overwritten by the device, the corresponding checkbox in the ETS application under "General / Screen saver / Standby" must not be activated.

9.4.1 Run-on times

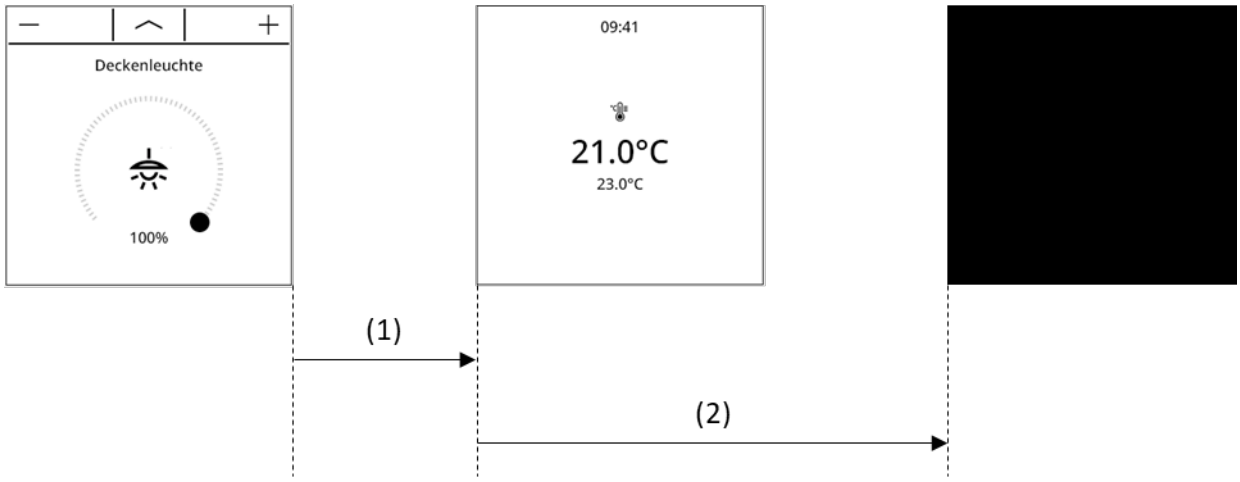


Fig. 14: Screen saver and standby

The time (1) until the screen saver displays can be parameterised via the ETS or on the device. The screen saver can display different functions. For example, it is possible to display the date and time or the room temperature including the set temperature with the screen saver.

A screen saver time period with the setting "never" means that the screen saver will not be displayed. In this case, the standby time period is the waiting time until the display goes into standby.

The time period for standby mode can also be parameterised via the ETS or on the device.
If the standby time period is set to "never", the display never goes into this state and the previous state (either screen saver or normal operation) is retained.

9.4.2 Disabling function

Enabling of the screen saver and the downstream standby can additionally be controlled with a time-based activation or a disabling object. Screen saver and standby can be disabled via the communication object. The polarity of this disabling is set via ETS parameters.

9.4.3 Planned time period

In addition, the screen saver can be parameterised so that it is only active during a specific time interval. The time interval can be parameterised by two 24-hour times T1 and T2.
- T1 defines the start from which the screen saver is active.
- T2 defines the end from which the screen saver is no longer active.

Outside the scheduled time period, the page last viewed is displayed (unless the device is disabled by the screen lock).
- If T1 > T2, e.g. T1= 18:00 and T2 = 02:00, this means that the screen saver is active during the day at 6:00 p.m. and inactive from 2:00 a.m. at night.
- If T1 < T2, e.g. T1 = 06:00 and T2 = 19:00, the screen saver is active from 6:00 a.m. and remains active until 7:00 p.m.

When the user touches or approaches the display, the normal operating mode is set and the screen saver/standby changes to the first favourites page.

9.4.4 Settings via the display

The display, the run-on times or the planned time period can be edited via the device.

Presentation

The presentation of the screen saver can be changed via the settings in the display.

Fig. 15: Settings – Screen saver selection

Fig. 16: Screen saver – Presentation selection

The following display functions are available for the screen saver:

Fig. 17: "Logo" screen saver

Fig. 18: "Clock" screen saver

Fig. 19: "Clock with date and day of the week" screen saver

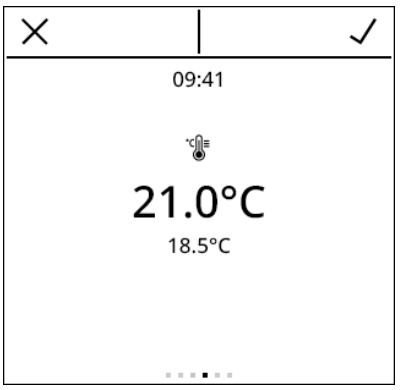


Fig. 20: "Room temperature (top) and set temperature (bottom)" screen saver

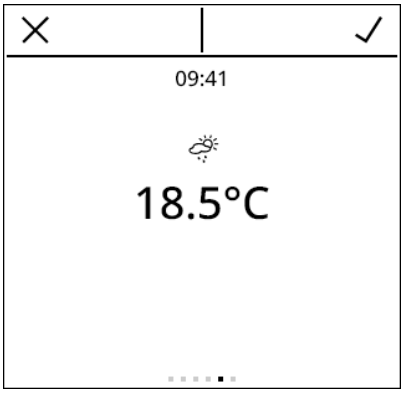


Fig. 21: "Outdoor temperature" screen saver

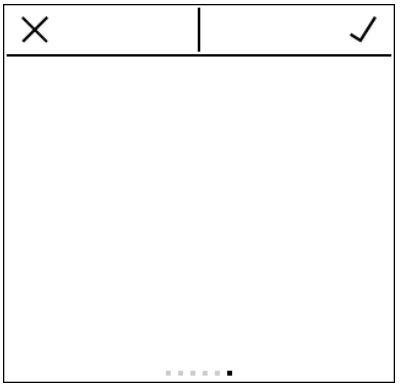


Fig. 22: "Background colour only" screen saver

Run-on time

The display settings can be used to change the run-on time of the screen saver and standby mode.

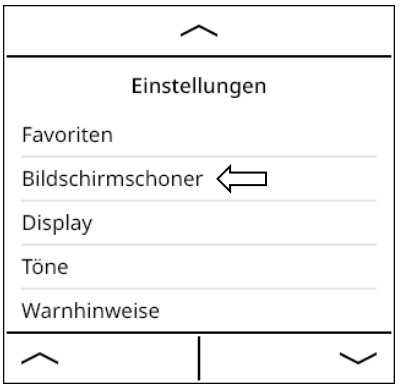


Fig. 23: Settings – Screen saver selection

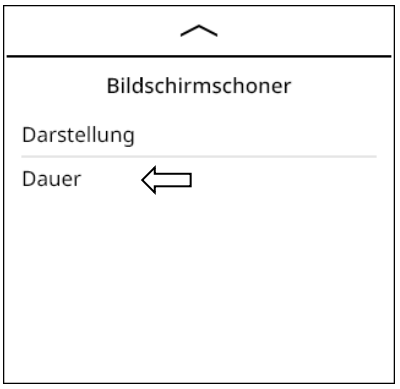


Fig. 24: Screen saver – Duration selection

Fig. 25: Run-on time selection

Fig. 26: Screen saver selection

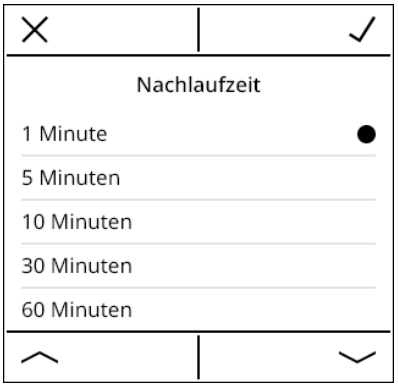


Fig. 27: Selection of desired run-on time

Planned time period

A scheduled time period for the screen saver can be configured via the settings in the display

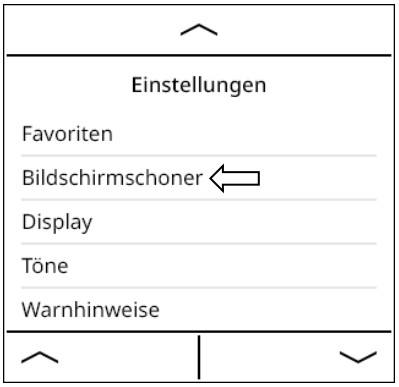


Fig. 28: Settings – Screen saver selection

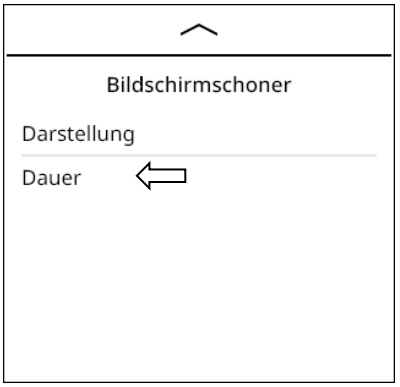


Fig. 29: Screen saver – Duration selection

Fig. 30: Selection of planned time period

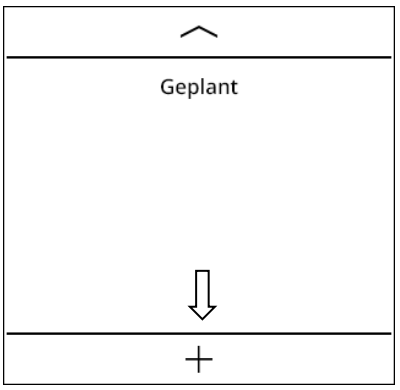


Fig. 31: Creating a new time period

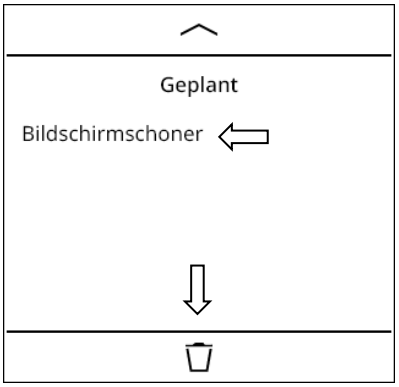


Fig. 32: Selecting or deleting planned time period

Fig. 33: Editing new or existing time period

Fig. 34: Defining the start of the time period

Fig. 35: Defining the end of the time period

Fig. 36: Confirming the configured time period

9.4.5 Flow chart

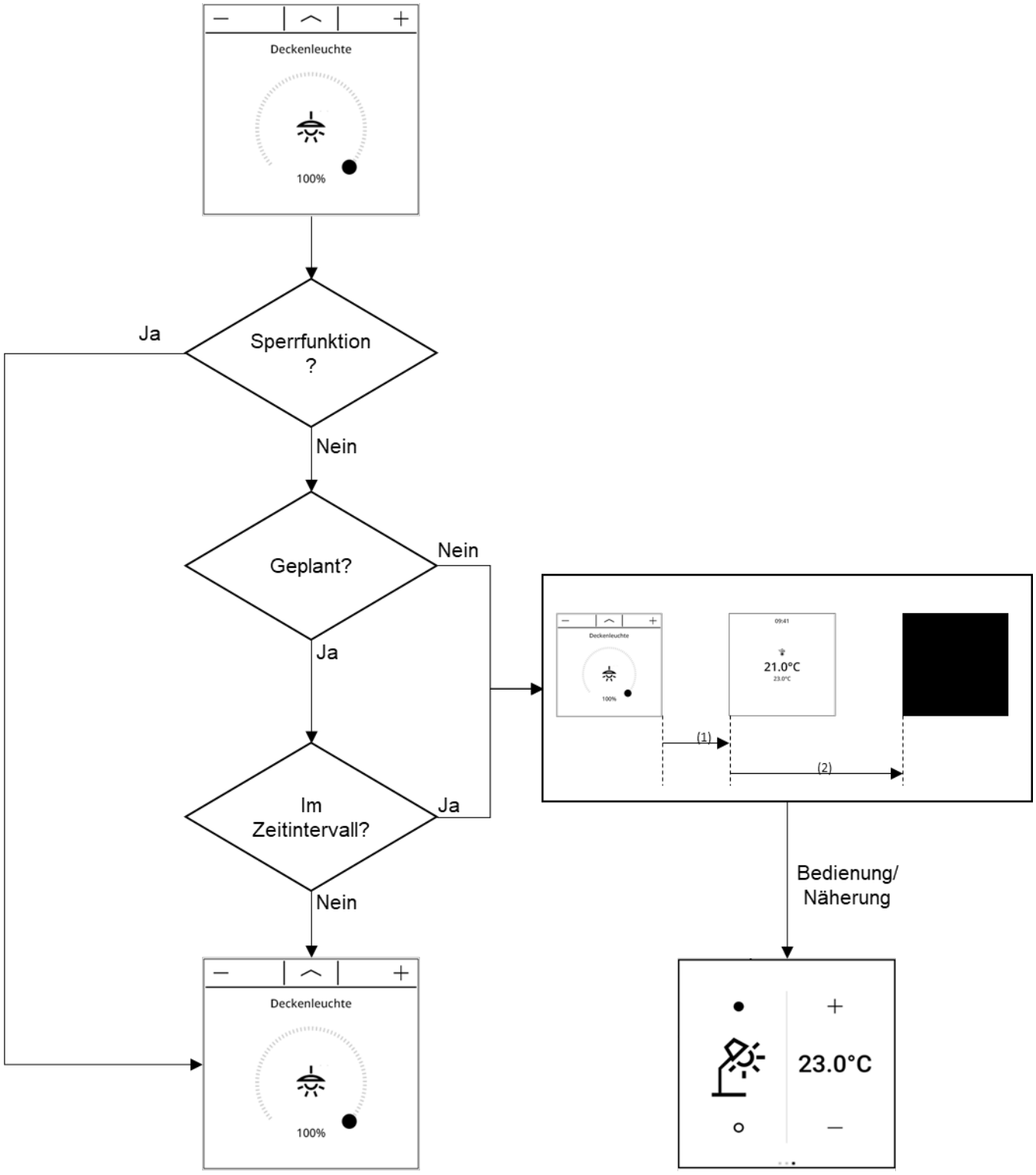


Fig. 37: Planned time period flow chart

9.4.6 Parameters

Display function	**Logo, clock, clock with date and weekday, room temperature (top) and set temperature (bottom), outdoor temperature, background colour only**
With this parameter, you can select which view is shown via the touch display when the screen saver is switched on. The screen saver is switched on if no touch operation has been performed for a parameterisable time and, furthermore, no person has been registered in the detection range of the proximity sensor during this time. This time is specified in the parameter "Run-on time until activation of screen saver". However, it is possible to prevent the screen saver from switching on with various parameter settings or with the object "Disable screen saver / standby".	

Screen saver	**Time-independent, Only during time period**
With the setting "Time-independent", the screen saver function is always active, i.e. the screen saver is never prevented from switching on. In contrast, the setting "Only during time period" prevents the screen saver from switching on during a specified time period. This means the screen saver function is deactivated for this period of time, so that the display assumes an "always-on" state during this period.	

Planned time period	**From: 00:00 ... 08:00 ... 23:59 Until: 00:00 ... 10:00 ... 23:59**
A period of time can be entered here during which the screen saver function is active. This means the screen saver can only be switched on during this time period. Outside this time period, the screen saver function is disabled and thus the screen saver is prevented from switching on. Note: If a time is specified here as the start time that specifies a later time of day than the end time, then a time period exceeding midnight is inferred that lasts from the end time to the subsequent start time. This parameter is only visible if "Only during time period" is parameterised for "Screen saver".	

Run-on time until the screen saver is activated	**1 minute, 5 minutes, 10 minutes, 30 minutes, 60 minutes, Never (no screen saver)**
The screen saver is switched on if no touch operation has been performed for the time parameterised here and, furthermore, no person has been detected in the detection range of the proximity sensor during this time. If "Never (no screen saver)" is selected, the screen saver is disabled.	

Run-on time until standby mode is activated	**1 minute, 5 minutes, 10 minutes, 30 minutes, 60 minutes, Never (no standby mode)**
In standby mode, the display is switched off completely. This protects the display and also saves power. If the screen saver is switched on at the device, the device will go into standby mode after some more time, provided that there is no touch operation and no person is detected in the detection range. This time is specified with this parameter. It is defined from the time the device switches on the screen saver. If the parameter "Run-on time until screen saver activation" is set to "Never (no screen saver)", the time set at this point corresponds to the time during which no touch operation has been performed and, furthermore, no person has been detected in the detection range of the proximity sensor. If "Never (no standby mode)" is selected, the device never goes into standby mode.	

Overwriting screen saver configuration in the device during ETS programming operation	Active, inactive
If this parameter is active, then all settings for the screen saver made by the user on the device are overwritten during an ETS programming operation. The following parameters are affected: "Display function", "Screen saver", "Planned time period", "Run-on time until screen saver activation" and "Run-on time until standby mode activation".	

Polarity of the "Disable screen saver / standby" object	0 = Enable / 1 = Disable, 1 = Enable / 0 = Disable
The parameter determines the polarity of the object "Disable screen saver / Standby".	

9.4.7 Objects

Object no.	Function	Name	Type	DPT	Flag
5	General – Input	Disable screen saver / Standby	1 bit	DPST-1-2	K, S, A
Object for disabling the screen saver function. The polarity of the disabling object is specified in the parameter "Disable screen saver / Standby object polarity". If disabling is active via the object, then the screen saver function is disabled and switching on the screen saver or switching off in standby is prevented.					

9.5 Tones

The LS Touch can generate a tone each time the display is pressed.
When an alarm message is activated, an acoustic message can also be generated with a low or normal volume. Tones for actuation and alarms can be switched on or off and the volume can be adjusted, both via the ETS parameters and on the device.

The properties set in the ETS application for the tones can be changed on the device. If the previously made setting is not to be overwritten by the device, the corresponding checkbox in the ETS application under "General / Tones" must not be activated.

9.5.1 Settings via the display

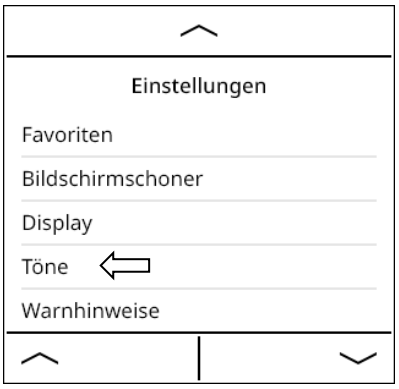


Fig. 38: Settings – Tone selection

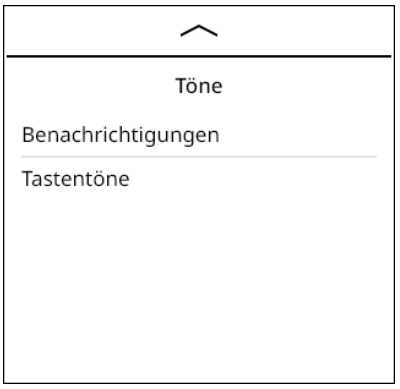


Fig. 39: Notification / key tone selection

Fig. 40: Message volume

Fig. 41: Switching key tones on or off

9.5.2 Parameters

Key tone	**Active, inactive**
This activation switches the key tone on or off when the display is actuated	

Alarm volume	**Off, Quiet, Regular**
This parameter sets the volume when the alarm message is activated.	

Overwriting tone settings on the device during ETS programming operation	**Active, inactive**
If this parameter is active, then all settings for tones by the user on the device are overwritten during an ETS programming operation. The following parameters are affected: "Key tone" and "Alarm volume".	

9.6 Proximity sensor switch function

Depending on the set run-on time, the screen saver and / or standby mode is activated. By approaching the LS Touch, favourites page 1 is automatically shown so that you can quickly operate the most important channel functions.

It is also possible to enable a communication object via the ETS parameters in order to communicate the status of the proximity sensor via the bus system.
By evaluation via a logic function, the lighting in the room can be switched on when persons are detected by the proximity sensor.

9.6.1 Parameters

1-bit output object on proximity	**Active, inactive**
This activation enables the object "Proximity sensor activated".	

Value of object	**On, Off**
The parameter sets the polarity of the object "Proximity sensor activated". The value transmitted depends on the "Value of object" parameter. If "Value of object" is parameterised to "ON", then the value of the object is "ON" when a proximity is detected. If no proximity is detected, the object is "OFF". If "Value of object" is parameterised to "OFF", then the value of the object is "OFF" when a proximity is detected. If no proximity is detected, the object is "ON". This parameter is only visible if the "1-bit output object on proximity" parameter is active.	

9.6.2 Object

Object no.	Function	Name	Type	DPT	Flag
7	General – Output	Proximity sensor activated	1 bit	DPST-1-2	K, Ü, A
Object for transmitting the status of a proximity detected by the device-internal proximity sensor. The proximity sensor detects objects up to a range of approx. 30 cm at a vertical distance from the display. The object is actively transmitting and is transmitted whenever the detection status changes. The value transmitted depends on the "Value of object" parameter. If "Value of object" is parameterised to "ON", then the value of the object is "ON" when a proximity is detected. If no proximity is detected, the object is "OFF". If "Value of object" is parameterised to "OFF", then the value of the object is "OFF" when a proximity is detected. If no proximity is detected, the object is "ON".					

9.7 Temperature measurement

9.7.1 Basics

The LS Touch has an integrated temperature sensor that can be used to detect the room temperature. A second possibility for measuring the room temperature is via an external sensor, for example a universal push-button sensor, which also has a temperature sensor. Alternatively (e.g. if the room thermostat is installed in an unfavourable location or under difficult operating conditions, e.g. in wet rooms) or additionally (e.g. in large rooms or halls), a hard-wired external temperature sensor can be connected to the device for temperature detection. In total, the device offers three methods for room temperature measurement, which can also run in parallel.

On the parameter pages "General → Temperature measurement", the three methods for room temperature measurement can be configured. Depending on the method, the temperature can be measured via the internal sensor or the external temperature sensor as an individual temperature value or as a combination of two temperature measurements. With the "External sensor" setting, a communication object is enabled to receive the temperature.

When selecting the mounting location, the controller or the external sensor, the following points must be taken into account:
- Do not mount the temperature sensors near large electrical loads (avoid heat exposure).
- Installation near radiators or cooling systems is not recommended.
- Prevent exposing the temperature sensors to direct sunlight.
- Installing sensors on the inside of an exterior wall may negatively affect temperature measurement.
- Temperature sensors should be installed at least 30 cm away from doors, windows or ventilation devices and at least 1.5 m above the floor.

ⓘ The room temperature measurement by the device is active independently of the "room temperature control" function and can thus be used autonomously (e.g. for simple measurement and display of a room temperature without control).

ⓘ After a device reset or after switching on the display backlight, there may be a deviation in the measured temperature. Comparison measurements to adjust the room temperature measurement should be taken approx. 30 minutes after the device has been reset or the display has been switched on.

9.7.2 Temperature detection and measured value formation

The parameter "Temperature measurement by" in the parameter node "General / Temperature measurement → ..." specifies which sensors are used to determine the room temperature.
The following settings are possible for temperature detection:

"Internal sensor"
The temperature sensor integrated in the device is activated. The actual temperature value is therefore only determined locally on the device.
With this parameterisation, control starts immediately after a device reset.

"External sensor"
The actual temperature is determined exclusively by a temperature value received from the bus. In this case, the sensor can be a KNX room thermostat coupled via the 2-byte object "External temperature value" or a controller extension with temperature detection.
After a device reset, the device first waits for a valid temperature telegram until control begins and, if necessary, a control value is output.

"External temperature sensor"
This option is only visible if the function of the input is set to "External temperature sensor" in the "General" parameter node. The actual temperature value is thus determined exclusively via the external temperature sensor connected to the LS Touch. With this parameterisation, control starts immediately after a device reset.

"Internal + external sensor"
This setting combines the selected temperature sources. The sensors can either be KNX room thermostats connected via the 2-byte object "External temperature" or controller extensions with temperature detection.
After a device reset, the device first waits for a valid temperature telegram until control begins and, if necessary, a control value is output.
The actual temperature is calculated during the evaluation from the two temperature values measured. The weighting of the temperature values is defined by the parameter "Measured value formation internal to external sensor". It is thus possible to adjust the actual temperature measurement depending on the different mounting locations of the sensors or a potentially different heat distribution in the room. Often, temperature sensors that are subject to negative external influences (for example, unfavourable mounting location due to direct sunlight, radiators or doors / windows in the immediate vicinity) are weighted less heavily.

"Internal sensor + external temperature sensor"
This option is only visible if the function of the input is set to "External temperature sensor" in the "General" parameter node.
This setting combines the selected temperature sources.
The actual temperature is calculated during the evaluation from the two temperature values measured. The weighting of the temperature values is defined by the parameter "Measured value formation internal sensor to external temperature sensor". It is thus possible to adjust the actual temperature measurement depending on the different mounting locations of the sensors or a potentially different heat distribution in the room. Often, temperature sensors that are subject to negative external influences (for example, unfavourable mounting location due to direct sunlight, radiators or doors / windows in the immediate vicinity) are weighted less heavily.

External sensor + external temperature sensor
This option is only visible if the function of the input is set to "External temperature sensor" in the "General" parameter node.
This setting combines the selected temperature sources.
The actual temperature is calculated during the evaluation from the two temperature values measured. The weighting of the temperature values is defined by the parameter "Measured value formation external sensor to external temperature sensor". It is thus possible to adjust the actual temperature measurement

depending on the different mounting locations of the sensors or a potentially different heat distribution in the room. Often, temperature sensors that are subject to negative external influences (for example, unfavourable mounting location due to direct sunlight, radiators or doors / windows in the immediate vicinity) are weighted less heavily.

Example: A room thermostat is installed next to the room entrance door (internal sensor). An additional wired temperature sensor is mounted on an internal wall in the centre of the room below the ceiling.
Internal sensor: 21.5 °C
Remote sensor: 22.3 °C
Measured value formation: 30 % to 70 %

→ $T_{Result\ internal} = T_{\ internal} \cdot 0.3 = 6.45$ °C,
→ $T_{Result\ external\ temperature\ sensor} = T_{external\ temperature\ sensor} \cdot 0.7 = 22.3$ °C $\cdot 0.7 = 15.61$ °C
→ $T_{Result\ actual} = T_{Result\ internal} + T_{Result\ external} = 22.06$ °C

9.7.3 Transmitting the actual temperature

The determined actual temperature can be transmitted to the bus via the 2-byte object "Actual temperature". The parameter "Transmit on temperature change by..." defines the temperature value by which the actual value must change before the actual temperature value is automatically transmitted via the object. Temperature value changes between 0.2 K and 20 K are possible. The setting "0" at this point deactivates the automatic transmission of the actual temperature.

In addition, the actual value can be sent out cyclically. The "Cyclical transmission of temperature" parameter sets the cycle time (1 to 255 minutes). The value "0" deactivates the cyclical transmission of the actual temperature value.
Please note that if cyclical transmission is deactivated and automatic transmission is switched off, no more telegrams are transmitted for the actual temperature in the event of a change!

After bus voltage return or after reprogramming by the ETS, the object value is updated according to the current actual temperature value and transmitted to the bus. If no temperature value telegram has yet been received via the "External temperature value" object when evaluating an external temperature sensor, only the value formed by the internal sensor is transmitted. If only the external sensor is used, the value "0" is in the "Actual temperature" object after a reset. For this reason, the external temperature sensor should always transmit the current value after a reset!

9.7.4 Adjusting the measured values

In some cases, it may be necessary to match the temperature values of the internal sensor and the external sensor (temperature value received) in the course of measuring the room temperature. For example, an adjustment is required if the temperature measured by the sensors is permanently below or above the actual temperature in the proximity of the sensor. To determine the temperature deviation, the actual room temperature should be determined by a reference measurement with a calibrated temperature measuring device.
The positive (temperature increase, factors: 1 ... 127) or negative (temperature decrease, factors: −128 ... −1) temperature adjustment can be parameterised in 0.1 K steps by means of the parameters "Adjustment of internal sensor" and / or "Adjustment of external sensor" and / or "Adjustment of external temperature sensor". The adjustment is thus statically set only once and is the same for all operating states of the controller.

ⓘ The measured value must be raised if the value measured by the sensor is below the actual room temperature. The measured value must be lowered if the value measured by the sensor is above the actual room temperature.

ⓘ The device always uses the calibrated temperature value for calculating the control values during room temperature control. The adjusted temperature value is transmitted to the bus via the "Actual temperature" object.

ⓘ If a measured value is calculated using two temperature sensors, the two calibrated values are always used for the actual value calculation.

9.7.5 Parameters

Temperature detection by	**Internal sensor, External sensor, External temperature sensor, Internal + External sensor, Internal sensor + External temperature sensor, External sensor + External temperature sensor**
The device can detect several temperature readings. A temperature reading can be obtained from the device-internal sensor and another temperature reading can be obtained from a external temperature sensor connected to the input contact. In addition, a measured temperature value provided by the bus via the "External temperature value" object can also be used. With this parameter, you can select which of these temperature measured values should be used to determine the room temperature. Combined use of the temperature measured values is also possible. However, the weighting with which the individual temperature measured values are to be included in the determination of the room temperature must also be specified in the "Measured value formation" parameter. The specific room temperature is provided on the bus via the "Actual temperature" object. The "Remote sensor" selection is only available if "External temperature sensor" is set in the "Input function" parameter. If an option with "external sensor" is selected, then the "External temperature value" object is enabled.	

Transmit on temperature change by (0 = inactive)	**0 ... 0.3 ... 20**
This parameter determines the magnitude of the room temperature change, after which it is automatically transmitted via the "Actual temperature" object.	

Cyclical transmission of the temperature (0 = inactive)	**0 ... 15 ... 255**
This parameter defines the time interval for cyclical transmission of the room temperature via the "Actual temperature" object.	

Measured value formation internal sensor to external sensor	**10 % to 90 %, 20 % to 80 %, 30 % to 70 %, 40 % to 60 %, 50 % to 50 %, 60 % to 40 %, 70 % to 30 %, 80 % to 20 %, 90 % to 10 %**
At this point, the weighting of the temperature measured value of the internal and the external sensor is determined. This results in a total measured value that is used for further evaluation of the room temperature. This parameter is only visible if "Internal sensor + external sensor" has been selected for "Temperature detection by".	

Measured value formation internal sensor to external temperature sensor	**10 % to 90 %, 20 % to 80 %, 30 % to 70 %, 40 % to 60 %, 50 % to 50 %, 60 % to 40 %, 70 % to 30 %, 80 % to 20 %, 90 % to 10 %**
This is where the weighting of the temperature measured value of the internal sensor and the external temperature sensor is set. This results in a total measured value that is used for further evaluation of the room temperature. This parameter is only visible if "Internal sensor + external temperature sensor" has been selected for "Temperature detection by".	

Measured value formation external sensor to external temperature sensor	**10 % to 90 %, 20 % to 80 %, 30 % to 70 %, 40 % to 60 %, 50 % to 50 %, 60 % to 40 %, 70 % to 30 %, 80 % to 20 %, 90 % to 10 %**
At this point, the weighting of the temperature measured value of the external sensor and the external temperature sensor is set. This results in a total measured value that is used for further evaluation of the room temperature. This parameter is only visible if "External sensor + external temperature sensor" has been selected for "Temperature detection by".	

Adjustment of internal sensor	**-10 ... 0 ... 10**
Determines the value by which the room temperature measured value of the internal sensor is adjusted. This parameter is only visible if the temperature detection provides for an internal sensor.	

Adjustment of external sensor	**-10 ... 0 ... 10**
Determines the value by which the room temperature measured value of the internal sensor is adjusted. This parameter is only visible if the temperature detection provides for an external sensor.	

Adjustment of external temperature sensor	**-10 ... 0 ... 10**
Determines the value by which the room temperature measured value of the internal sensor is adjusted. This parameter is only visible if the temperature detection provides for an external temperature sensor.	

9.7.6 Objects

Object no.	Function	Name	Type	DPT	Flag
232	General – Output	Actual temperature	2 bytes	DPST-9-1	K, Ü, A
Object for outputting the actual temperature (room temperature) determined by the controller. Measuring range internal temperature sensor: 0 °C to +40 °C. The temperature value is always output in the format "°C".					

Object no.	Function	Name	Type	DPT	Flag
233	General – Input	External temperature value	2 bytes	DPST-9-1	K, S, A
Object for coupling an external KNX room temperature sensor. This allows cascading of several temperature sensors for room temperature measurement. The temperature value must always be specified in the format "°C". The object is only enabled if the "Temperature detection by" parameter is set to "External sensor", "Internal or external sensor" or "External sensor and external temperature sensor".					

9.8 Password protection

The LS Touch provides the option of requesting a password at various levels:

At area level:
A password is requested only when a protected area is selected.

At menu level:
When the menu page is opened (swipe from bottom to top), a password is requested.

Settings:
A password is only requested when the settings are opened.

Switching times:
A password is only requested when the switching times are selected.

After restart / screen saver / standby:
Before the favourites are displayed, a password is requested.

ⓘ Only a 4-digit sequence of numbers is permitted for the password.

ⓘ Once the password is entered, all password-protected pages are enabled until a restart or the activation of the screen saver / standby mode.

ⓘ If no screen saver / standby is configured, the only way to reactivate the password protection is to restart the device.

Fig. 42: Settings – Restart selection

ⓘ In unprogrammed condition or after a master reset, the demo mode is activated and the settings are password-protected with the password "0000".

ⓘ The password protection properties set in the ETS application can be changed via the touch display. If you do not want to overwrite the setting previously made in the device, do not activate the corresponding checkbox in the ETS application under "General / Password protection".

9.8.1 Settings on the device

Setting the password

Fig. 43: Settings – Password protection selection

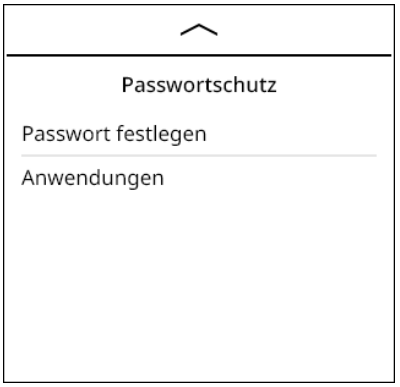


Fig. 44: Set new password

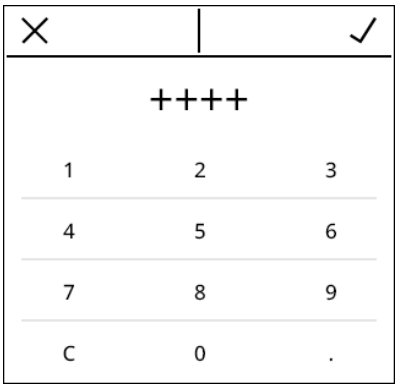


Fig. 45: Enter new password

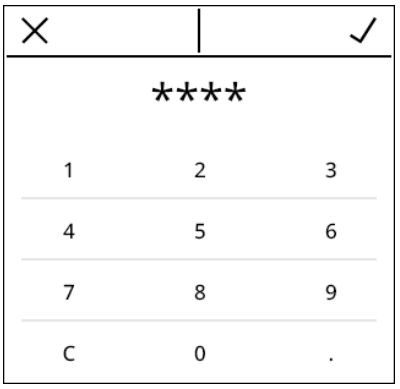


Fig. 46: Confirm password

Selecting applications

Fig. 47: Application selection

Fig. 48: Selecting applications

9.8.2 Parameters

Password	Exactly 4 digits required Default: 0000
The complete operation of the device can be password-protected. For this purpose, the parameter "Password entry after restart / screensaver / standby" must be activated. It is also possible to protect only specific pages with a password. To do this, the corresponding following parameters must be activated. As soon as a page for which password protection has been activated is called up, an input mask for entering the password consisting of 4 digits is displayed. After successful entry, the desired page is called up. After a successful entry, all password-protected pages are enabled so that it is not necessary to enter the password again. This is only required again after the device has been restarted or the device has switched to standby or screen saver mode. If an incorrect password is entered, it can be re-entered as often as desired. The password is set as "0000" in the default setting. The password can also be changed on the device.	

Overwriting the password and password settings on the device during ETS programming operation	Active, inactive
If this parameter is active, then all settings for the password protection made by the user on the device are overwritten during an ETS programming operation. The following parameters are affected: "Password", "Password entry after restart / screen saver / standby", "Password entry before settings", "Password entry before switching times", "Password entry before menu page", "Password entry before area 1", "Password entry before area 2", "Password entry before area 3", "Password entry before area 4", "Password entry before area 5", and "Password entry before area 6".	

Password entry after restart / screen saver / standby	Active, inactive
If the parameter is activated, then a password entry is requested in the following situations: When restarting the device, When reactivating the display from screen saver mode, When reactivating the device from standby mode. This means that the device can only be used with a password.	

Password entry before settings	Active, inactive
If this parameter is activated, the password must be entered before the "Settings" page can be called up.	

Password entry before switching times	Active, inactive
If this parameter is activated, the password must be entered before the "Switching times" page can be called up.	

Password entry before menu page	Active, inactive
If this parameter is activated, the password must be entered before the "Menu page" can be called up.	

Password entry before area 1	Active, inactive
If this parameter is activated, the password must be entered before the "Area 1" can be called up.	

Password entry before area 2	Active, inactive
If this parameter is activated, the password must be entered before the "Area 2" can be called up. This parameter is only visible if area 2 has been enabled.	

Password entry before area 3	Active, inactive
If this parameter is activated, the password must be entered before the "Area 3" can be called up. This parameter is only visible if area 3 has been enabled.	

Password entry before area 4	Active, inactive
If this parameter is activated, the password must be entered before the "Area 4" can be called up. This parameter is only visible if area 4 has been enabled.	

Password entry before area 5	Active, inactive
If this parameter is activated, the password must be entered before the "Area 5" can be called up. This parameter is only visible if area 5 has been enabled.	

Password entry before area 6	Active, inactive
If this parameter is activated, the password must be entered before the "Area 6" can be called up. This parameter is only visible if area 6 has been enabled.	

10. Channel functions

Up to 32 channel functions are available, which can be operated via the touch display and whose status is shown via the display.
Each function created has its own detail page for operation.
The following function types can be created and configured via the ETS application:

- Switching
- Dimming
- Dimming Tunable White
- Dimming RGB
- Shutter / Awning / Blind
- Value transmitter
- Scene extension

The user can open channel functions via an area page as a detail page. Additionally, he can assign them to a favourites page.

Number	**1 ... 32**
"The value determines the number of channels that can be used on the device. One or more detail pages are created on the device for each channel. The number of detail pages per channel depends on the function of the channel, which is defined in the "Function" parameter. When parameterising the device, the channels should be defined first, as other settings such as favourites pages, area pages, the menu page and also timer switches always use references to the channels."	

10.1 General parameters for functions

Inscription (1)	**free text with max. 28 characters** **Default: empty**
The text is displayed as the heading of the channel's detail page. In addition, the text entered in this parameter is used to identify the channel in the ETS parameter window and is carried over into the name of the objects.	

Function	Switching, Dimming, Dimming Tunable White, Dimming RGB, Shutter / Awning / Blind, Value transmitter, Scene extension

The parameter determines the function of the channel. Depending on selected function, the channel has a different number of detail pages on the device. Similarly, the enabled objects and parameters of the channel depend on this parameter. The preview images in the ETS application illustrate the view of the detail pages of the channel on the device. The preview images are exemplary and their view can be partially parameterised. Parameterisable areas in a view are marked with a footnote, e.g. (1), in the corresponding preview image. The ETS parameter that affects this parameterisable area has the same footnote.

The following functions are available:
- Switching: Switching on and off using an object.
- Dimming: Absolute dimming of a lamp using one object for brightness and one for colour temperature.
- Dimming Tunable White: Absolute dimming of a Tunable White lamp using one object for brightness and one for colour temperature.
- Dimming RGB: Absolute dimming of an object using an RGB colour value object of type DPST-232-600
- Shutter / Awning / Blind: Moving the shutter, awning or blind using objects for relative and absolute control of actuators.
- Value transmitter: Sending a value transmitter object. The data type of the object depends on the "Functionality" parameter.
- Scene extension: Calling up scenes with the help of the "Scene extension" object.

Icon (2)	No assignment, bathroom, bedroom, broom cupboard, dining room, dressing room, hobby room, garden, kitchen, living room, office, pool, terrace, toilet, cloakroom, ceiling lamp, stand lamp, stand lamps, floor lamp, mirror lamp, outdoor lamp, outdoor floor lamp, pendant, ceiling spotlight, staircase lamp, table lamp, wall lamp, LED strips – floor, LED strip – ceiling, awning, blind – door, blind – horizontal, blind – vertical, weather, sun, temperature indication, outside temperature indication, temperature setting, fan setting, info, time, settings, switch off, music, pause, play, radio, playlist, volume, cleaning mode, comfort mode, absent, candle, Christmas, cleaning, coffee, cooking, day, dinner, garden, film, music, night, scene number, party, reading, relaxing, sleeping, watching TV, guests

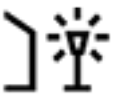
The icon selected here is displayed on the detail page or on all detail pages of the channel. Similarly, the icon is displayed in the field of the favourites page if the channel has been assigned to the field.
Please note: There is an exception for the blind function. Here, the slat icon is always displayed on the second detail page for adjusting the slat. This is independent of which icon has been selected here.

10.2 Icon overview

An icon can be displayed for each channel function created; you can choose from the entire library of 102 icons here. This library also contains icons that are intended for areas. For this reason, this documentation contains a preferred list of icons per channel function that can best be used for the corresponding channel function.

The following list shows the entire library of 102 icons:

 Acknowledgement	 Alarm	 Area – Bathroom	 Area – Bedroom
 Area – Cleaning (broom cupboard)	 Area – Dining (dining room)	 Area – Dressing (dressing room)	 Area – Floor – Attic (attic)
 Area – Floor – Basement (basement)	 Area – Floor – First (first floor)	 Area – Floor – Ground (ground floor)	 Area – Floor – Stairs (stairs)
 Area – Freetime (hobby room)	 Area – Garden (garden)	 Area – Kitchen (kitchen)	 Area – Living (living room)
 Area – Office (office)	 Area – Person – Boy (boy)	 Area – Person – Girl (girl)	 Area – Person – Man (man)
 Area – Person – Woman (woman)	 Area – Pool (pool)	 Area – Terrace (terrace)	 Area – Toilet (toilet)
 Area – Wardrobe (cloakroom)	 Blinds – Awning (awning)	 Blinds – Door (blind – door)	 Blinds – Horizontal (blind – horizontal)

 Blinds – Slats (blind – slat)	 Blinds – Vertical (blind – vertical)	 Cleaning (cleaning mode)	 Climate – Building protection (building protection)
 Climate – Comfort (comfort mode)	 Cimate – Frost protection (frost protection)	 Climate – Heat protection (heat protection)	 Climate – Night (night mode)
 Climate – Standby (standby mode)	 Climate – Temp – Celcius (temperature indication)	 Climate – Temp – Outside (outside temperature indication)	 Climate – Temp – Setpoint (temperature setting)
 Climate – Ventilation (fan setting)	 Door communication (Door communication)	 Garage (garage)	 Info (information)
 Lights – Bulb (light bulb)	 Lights – Ceiling (ceiling lamp)	 Lights – Floor – 1 (stand lamp)	 Lights – Floor – 2 (stand lamps)
 Lights – Floor – 3 (floor lamp)	 Lights – LED (LED panel)	 Lights – LED – 1 (LED strips floor)	 Lights – LED – 2 (LED strips ceiling)
 Lights – Mirror (mirror lamp)	 Lights – Orientation (pilot light)	 Lights – Outdoor (outdoor floor lamp)	 Lights – Outdoor – 1 (outdoor lamp)

 Lights – Outdoor – 2 (outdoor lamps)	 Lights – Pendant (pendant)	 Lights – Spot (ceiling spotlight)	 Lights – Stairs (staircase lamp)
 Lights – Stairs – Orient (staircase spotlight)	 Lights – Table (table lamp)	 Lights – Wall (wall lamp)	 Measurements – Limit (limit value)
 Music (music)	 Navigation – Escape (navigation – cancel)	 Navigation – OK (navigation – OK)	 Pause (pause)
 Play (play)	 Playlist (Playlist)	 Radio (radio)	 Ramp (volume)
 Scene – Absent (absent)	 Scene – Candle (candle)	 Scene – Christmas (Christmas)	 Scene – Cleaning (cleaning)
 Scene – Coffee (coffee)	 Scene – Cooking (cooking)	 Scene – Day (day)	 Scene – Dinner (dinner)
 Scene – Garden (garden)	 Scene – Movie (movie)	 Scene – Music (music)	 Scene – Night (night)
 Scene – Number (scene number)	 Scene – Party (party)	 Scene – Reading (reading)	 Scene – Relax (relaxing)

 Scene – Sleeping (sleeping)	 Scene – TV (television)	 Scene – Visit (guests)	 Settings (settings)
 Switching – Battery (switching – battery)	 Switching – Circle (switching – circles)	 Switching – Lock (switching – lock)	 Switching – outside (switching – outside)
 Switching – Power (switching – power)	 Switching – Socket (switching – socket)	 Time (time)	 Warning (warning)
 Weather – General (weather)	 Weather – Sun (sunlight)		

10.3 Switching

For each channel whose function is set to "Switching", the ETS displays two 1-bit communication objects. When operating this function, the objects are used as follows:

10.3.1 Favourites page 1-gang, 2-gang or 3-gang display (top or right)

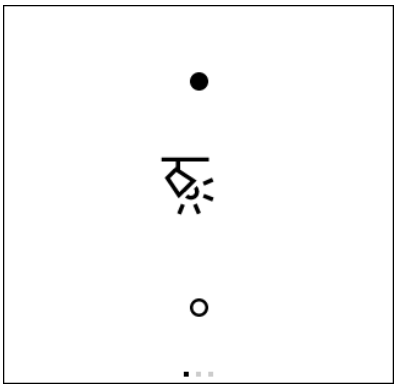


Fig. 49: Switching favourites, 1-gang

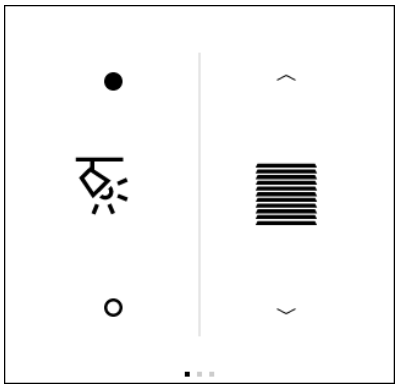


Fig. 50: Switching favourites, 2-gang

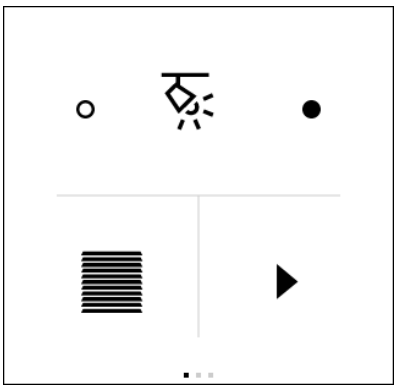


Fig. 51: Switching favourites, 3-gang top

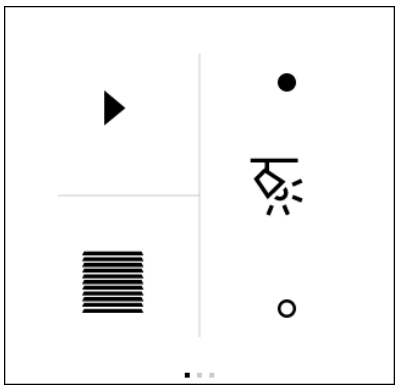


Fig. 52: Switching favourites, 3-gang right

Operation of filled circle:
Value "1" via the "Switching" object

Operation of empty circle:
Value "1" via the "Switching" object

Tap the centre of the control element (icon):
Switching via the "Switching" object

Press and hold the centre of the control element (icon):
Detail page is shown

10.3.2 Favourites page 3-gang (top or bottom left) or 4-gang display

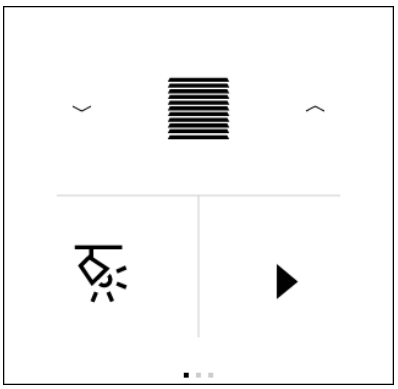


Fig. 53: Switching favourites, 3-gang bottom left

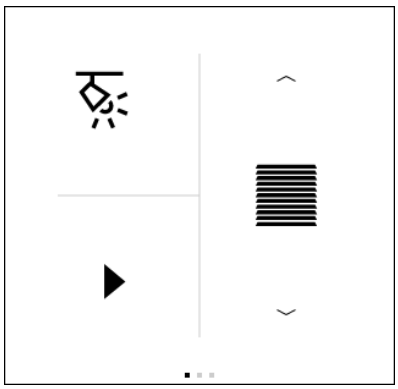


Fig. 54: Switching favourites, 3-gang top left

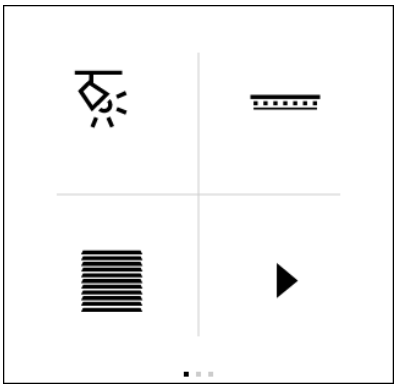


Fig. 55: Switching favourites, 4-gang

Tap the centre of the control element (icon):
Switching via the "Switching" object

Press and hold the centre of the control element (icon):
Detail page is shown

10.3.3 Detail page

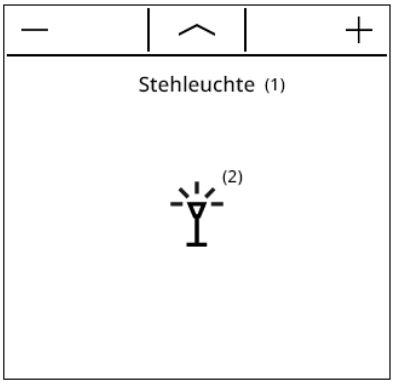


Fig. 56: Switching detail page

Pressing -:
Value "0" via the "Switching" object

Pressing +:
Value "1" via the "Switching" object

Tap the centre of the control element (icon):
Switching via the "Switching" object

The following icons have both an "On" and an "Off" status, and are thus best suited for the "Switching" channel function.

Lights – Bulb (light bulb)	Lights – Ceiling (ceiling lamp)	Lights – Floor – 1 (stand lamp)	Lights – Floor – 2 (stand lamps)
Lights – Floor – 3 (floor lamp)	Lights – LED (LED panel)	Lights – LED – 1 (LED strips floor)	Lights – LED – 2 (LED strips ceiling)
Lights – Mirror (mirror lamp)	Lights – Orientation (pilot light)	Lights – Outdoor (outdoor floor lamp)	Lights – Outdoor – 1 (outdoor lamp)
Lights – Outdoor – 2 (outdoor lamps)	Lights – Pendant (pendant)	Lights – Spot (ceiling spotlight)	Lights – Stairs (staircase lamp)

 Lights – Stairs – Orient (staircase spotlight)	 Lights – Table (table lamp)	 Lights – Wall (wall lamp)	 Switching – Battery (switching – battery)
 Switching – Circle (switching – circles)	 Switching – Lock (switching – lock)	 Switching – outside (switching – outside)	 Switching – Power (switching – power)
 Switching – Socket (switching – socket)			

10.3.4 Object list

The following communication objects are available for the switching function.
The name of the object can be adjusted by the "Inscription" parameter.

Object no.	Function	Name	Type	DPT	Flag
19, …	Channel n – Output	Switching	1 bit	DPST-1-1	K, Ü, A
Object for transmitting switching telegrams (ON, OFF).					

Object no.	Function	Name	Type	DPT	Flag
20, …	Channel n – Input	Switching feedback	1 bit	DPST-1-1	K, S, A
Object for feedback of a switching status to the device. This affects the status text and status icon of the corresponding channel on the device, which are shown in the display area of the channel element. The feedback of the switching status must be provided by the "actively transmitting" actuator. If the controlled KNX switch actuator does not have a separate status feedback, this object must be connected to the "Channel X – Switching" object via an identical group address.					

10.4 Dimming

For each channel whose function is set to "Dimming", the ETS displays two 1-bit and two 1-byte communication objects. When operating this function, the objects are used as follows:

10.4.1 Favourites page 1-gang, 2-gang or 3-gang display (top or right)

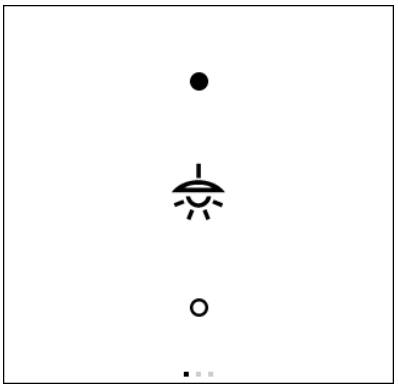


Fig. 57: Dimming favourites, 1-gang

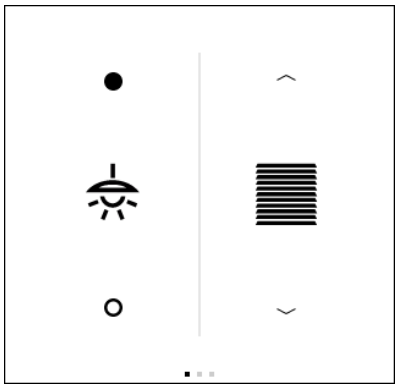


Fig. 58: Dimming favourites, 2-gang

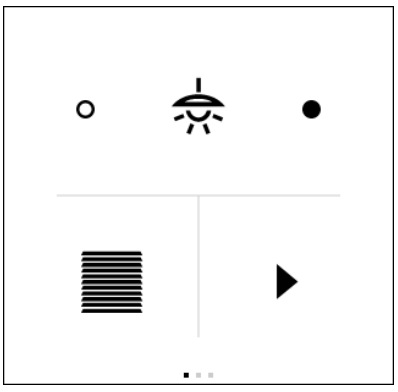


Fig. 59: Dimming favourites, 3-gang top

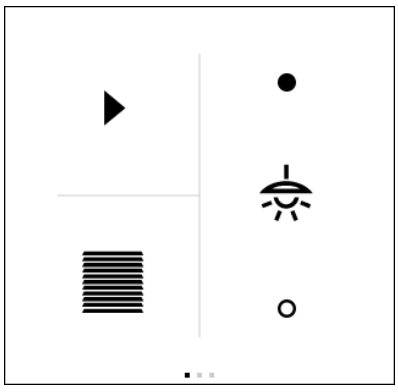


Fig. 60: Dimming favourites, 3-gang right

Brief pressing of filled circle:
Increase brightness value by 5 % via the "brightness value" object

Long pressing of filled circle:
Repeatedly increase brightness value by 5 % via the "brightness value" object

Brief pressing of empty circle:
Decrease brightness value by 5 % via the "brightness value" object

Long pressing of empty circle:
Repeatedly decrease brightness value by 5 % via the "brightness value" object

Tap the centre of the control element (icon):
Switching via the "Switching" object

Press and hold the centre of the control element (icon):
Detail page is shown

10.4.2 Favourites page 3-gang (top or bottom left) or 4-gang display

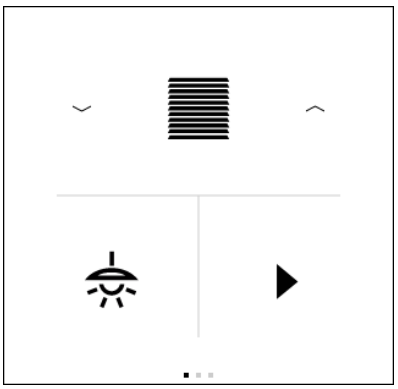


Fig. 61: Dimming favourites, 3-gang bottom left

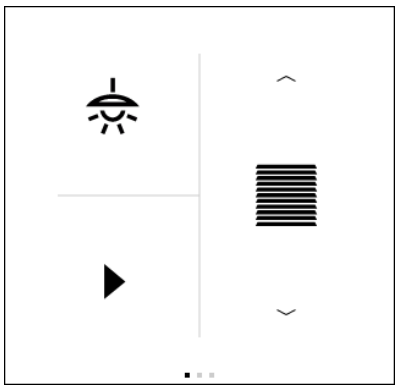


Fig. 62: Dimming favourites, 3-gang top left

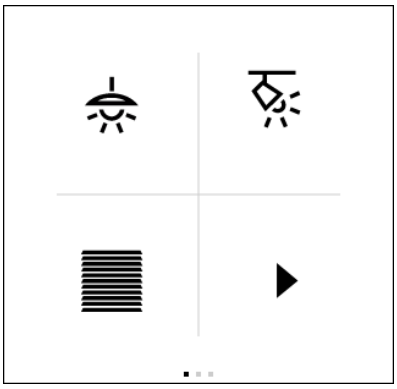


Fig. 63: Dimming favourites, 4-gang

Tap the centre of the control element (icon):
Switching via the "Switching" object

Press and hold the centre of the control element (icon):
Detail page is shown

10.4.3 Detail page

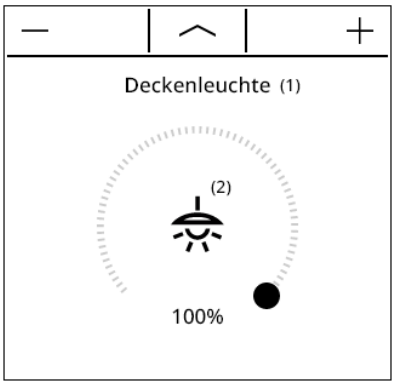


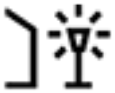
Fig. 64: Dimming detail page

Pressing -:
Decrease brightness value by 1 %, repeated in bigger increments with long pressing

Pressing +:
Increase brightness value by 1 %, repeated in bigger increments with long pressing

Touch operation via the slider:
The newly selected value is transmitted via the "Brightness value" object

The following icons have 4 states for displaying the brightness value on a favourites page or on the detail page, and are therefore best suited for the "Dimming" channel function.

 Lights – Bulb (light bulb)	 Lights – Ceiling (ceiling lamp)	 Lights – Floor – 1 (stand lamp)	 Lights – Floor – 2 (stand lamps)
 Lights – Floor – 3 (floor lamp)	 Lights – LED (LED panel)	 Lights – LED – 1 (LED strips floor)	 Lights – LED – 2 (LED strips ceiling)
 Lights – Mirror (mirror lamp)	 Lights – Orientation (pilot light)	 Lights – Outdoor (outdoor floor lamp)	 Lights – Outdoor – 1 (outdoor lamp)
 Lights – Outdoor – 2 (outdoor lamps)	 Lights – Pendant (pendant)	 Lights – Spot (ceiling spotlight)	 Lights – Stairs (staircase lamp)
 Lights – Stairs – Orient (staircase spotlight)	 Lights – Table (table lamp)	 Lights – Wall (wall lamp)	

10.4.4 Object list

Object no.	Function	Name	Type	DPT	Flag
19, …	Channel n – Output	Switching	1 bit	DPST-1-1	K, Ü, A
Object for transmitting switching telegrams (ON, OFF).					

Object no.	Function	Name	Type	DPT	Flag
20, …	Channel n – Input	Switching feedback	1 bit	DPST-1-1	K, S, A
Object for feedback of a switching status to the device. This affects the status text and status icon of the corresponding channel on the device, which are shown in the display area of the channel element. The feedback of the switching status must be provided by the "actively transmitting" actuator. If the controlled KNX switch actuator does not have a separate status feedback, this object must be connected to the "Channel X – Switching" object via an identical group address.					

Object no.	Function	Name	Type	DPT	Flag
21, …	Channel 1 – Output	Brightness value	1 bytes	DPST-5-1	K, Ü, A
Object for sending brightness value telegrams (0 ... 255). This can be used to control a dimming actuator. The decimal data values 0 ... 255 transmitted must be evaluated by the actuator as percentage values 0 ... 100 %.					

Object no.	Function	Name	Type	DPT	Flag
22, …	Channel 1 – Input	Brightness value feedback	1 bytes	DPST-5-1	K, S, A
Object for receiving brightness value telegrams that are transmitted by a dimming actuator, for example. This affects the status value, status icon and the slider position of the corresponding channel on the device. The feedback of the brightness value must be provided by the "actively transmitting" actuator. If the controlled KNX dimming actuator does not have separate brightness value feedback, this object must be connected to the "Channel X – Brightness value" object with the identical group address as for transmission. The decimal data values 0 ... 255 are evaluated as percentage values 0 ... 100 %.					

10.5 Dimming Tunable White

For each channel whose function is set to "Dimming Tunable White", the ETS displays two 1-bit, two 1-byte and two 2-byte communication objects. When operating this function, the objects are used as follows:

10.5.1 Favourites page 1-gang, 2-gang or 3-gang display (top or right)

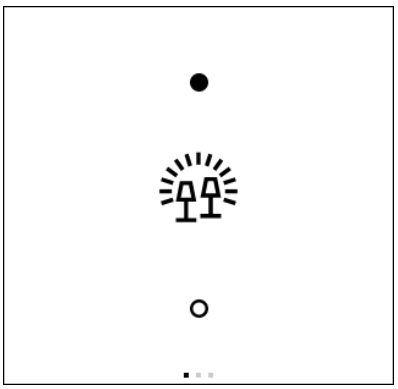


Fig. 65: Dimming Tunable White Favourites, 1-gang

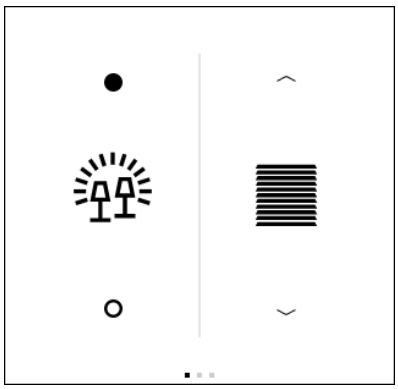


Fig. 66: Dimming Tunable White Favourites, 2-gang

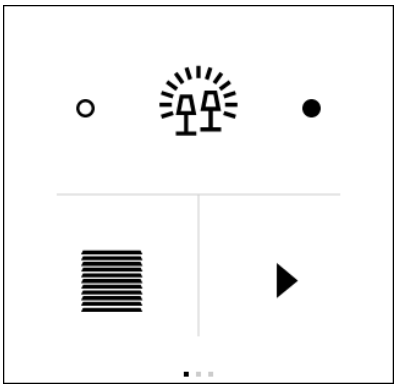


Fig. 67: Dimming Tunable White Favourites, 3-gang top

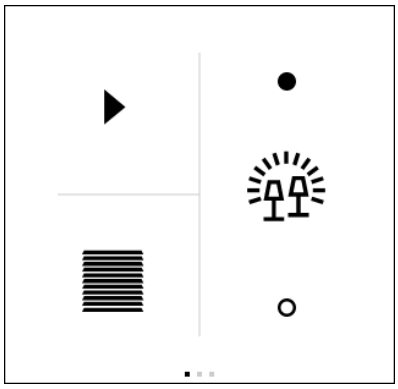


Fig. 68: Dimming Tunable White Favourites, 3-gang right

Brief pressing of filled circle:
Increase brightness value by 5 % via the "brightness value" object

Long pressing of filled circle:
Repeatedly increase brightness value by 5 % via the "brightness value" object

Brief pressing of empty circle:
Decrease brightness value by 5 % via the "brightness value" object

Long pressing of empty circle:
Repeatedly decrease brightness value by 5 % via the "brightness value" object

Tap the centre of the control element (icon):
Switching via the "Switching" object

Press and hold the centre of the control element (icon):
Detail page 1 will be shown

10.5.2 Favourites page 3-gang (top or bottom left) or 4-gang display

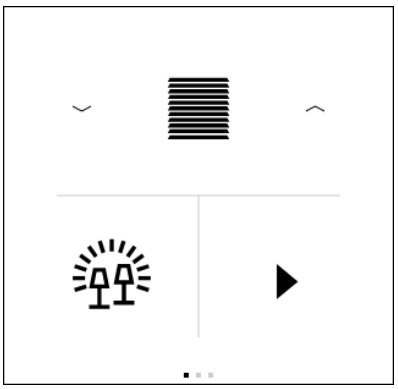


Fig. 69: Dimming Tunable White Favourites, 3-gang bottom left

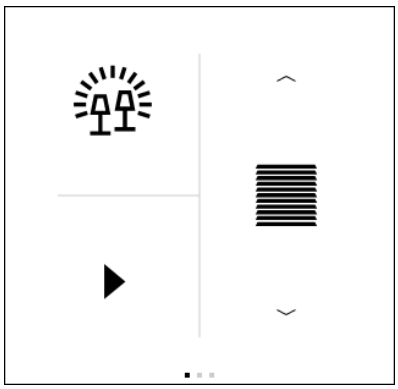


Fig. 70: Dimming Tunable White Favourites, 3-gang top left

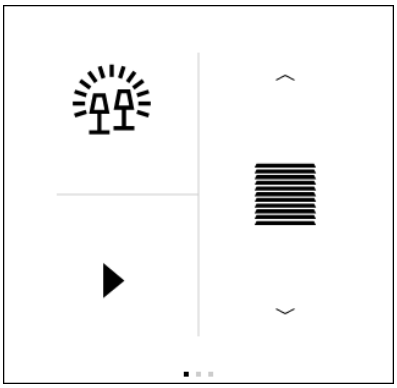


Fig. 71: Dimming Tunable White favourites, 4-gang

Tap the centre of the control element (icon):
Switching via the "Switching" object

Press and hold the centre of the control element (icon):
Detail page 1 will be shown

10.5.3 Detail page 1 Brightness

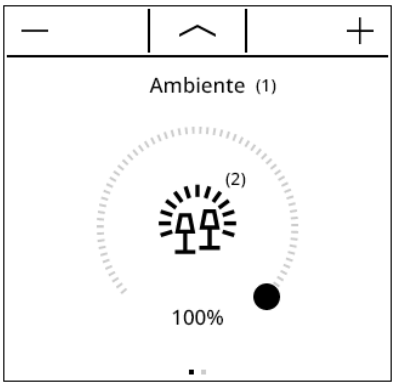


Fig. 72: Dimming Tunable White Detail page 1 Brightness

Pressing -:
Decrease brightness value by 1 %, repeated in bigger increments with long pressing

Pressing +:
Increase brightness value by 1 %, repeated in bigger increments with long pressing

Touch operation via the slider:
The newly selected value is transmitted via the "Brightness value" object

10.5.4 Detail page 2 Colour temperature

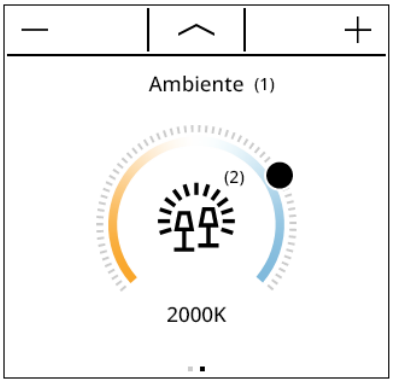


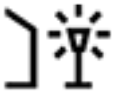
Fig. 73: Dimming Tunable White Detail page 2 Colour temperature

Pressing -:
Decrease colour temperature by 50 K, repeated in bigger increments with long pressing

Pressing +:
Increase colour temperature by 50 K, repeated in bigger increments with long pressing

Touch operation via the slider:
The newly selected value is transmitted via the "Colour temperature" object

The following icons have 4 states for displaying the brightness value on a favourites page or on the detail page, and are therefore best suited for the "Dimming Tunable White" channel function.

 Lights – Bulb (light bulb)	 Lights – Ceiling (ceiling lamp)	 Lights – Floor – 1 (stand lamp)	 Lights – Floor – 2 (stand lamps)
 Lights – Floor – 3 (floor lamp)	 Lights – LED (LED panel)	 Lights – LED – 1 (LED strips floor)	 Lights – LED – 2 (LED strips ceiling)
 Lights – Mirror (mirror lamp)	 Lights – Orientation (pilot light)	 Lights – Outdoor (outdoor floor lamp)	 Lights – Outdoor – 1 (outdoor lamp)
 Lights – Outdoor – 2 (outdoor lamps)	 Lights – Pendant (pendant)	 Lights – Spot (ceiling spotlight)	 Lights – Stairs (staircase lamp)
 Lights – Stairs – Orient (staircase spotlight)	 Lights – Table (table lamp)	 Lights – Wall (wall lamp)	

10.5.5 Object list

Object no.	Function	Name	Type	DPT	Flag
19, …	Channel n – Output	Switching	1 bit	DPST-1-1	K, Ü, A
Object for transmitting switching telegrams (ON, OFF).					

Object no.	Function	Name	Type	DPT	Flag
20, …	Channel n – Input	Switching feedback	1 bit	DPST-1-1	K, S, A
Object for feedback of a switching status to the device. This affects the status text and status icon of the corresponding channel on the device, which are shown in the display area of the channel element. The feedback of the switching status must be provided by the "actively transmitting" actuator. If the controlled KNX switch actuator does not have a separate status feedback, this object must be connected to the "Channel X – Switching" object via an identical group address.					

Object no.	Function	Name	Type	DPT	Flag
21, …	Channel 1 – Output	Brightness value	1 bytes	DPST-5-1	K, Ü, A
Object for sending brightness value telegrams (0 ... 255). This can be used to control a dimming actuator. The decimal data values 0 ... 255 transmitted must be evaluated by the actuator as percentage values 0 ... 100 %.					

Object no.	Function	Name	Type	DPT	Flag
22, …	Channel 1 – Input	Brightness value feedback	1 bytes	DPST-5-1	K, S, A
Object for receiving brightness value telegrams that are transmitted by a dimming actuator, for example. This affects the status value, status icon and the slider position of the corresponding channel on the device. The feedback of the brightness value must be provided by the "actively transmitting" actuator. If the controlled KNX dimming actuator does not have separate brightness value feedback, this object must be connected to the "Channel X – Brightness value" object with the identical group address as for transmission. The decimal data values 0 ... 255 are evaluated as percentage values 0 ... 100 %.					

Object no.	Function	Name	Type	DPT	Flag
23	Channel 1 – Output	Colour temperature (Kelvin)	2 bytes	DPST-7-600	K, Ü, A
Object for transmitting colour temperature telegrams (0 K ... 65535 K). This can be used to control a dimming actuator. The transmitted decimal data values 0 ... 65535 must be evaluated by the actuator as colour temperature values 0 K ... 65535 K.					

Object no.	Function	Name	Type	DPT	Flag
24	Channel 1 – Input	Colour temperature (Kelvin) feedback	2 bytes	DPST-7-600	K, S, A
Object for receiving colour temperature telegrams that are transmitted by a dimming actuator, for example. This affects the status value, status icon and the slider position of the corresponding channel on the device. The feedback of the colour temperature value must be provided by the "actively transmitting" actuator. If the controlled KNX dimming actuator does not have separate colour temperature feedback, this object must be connected to the "Channel X – Colour temperature (Kelvin)" object with the identical group address as for transmission. The decimal data values 0 ... 65535 are evaluated as colour temperature values 0 K ... 65535 K.					

10.6 Dimming RGB

For each channel whose function is set to "Dimming RGB", the ETS displays two 1-bit and two 3-byte communication objects. When operating this function, the objects are used as follows:

10.6.1 Favourites page 1-gang, 2-gang or 3-gang display (top or right)

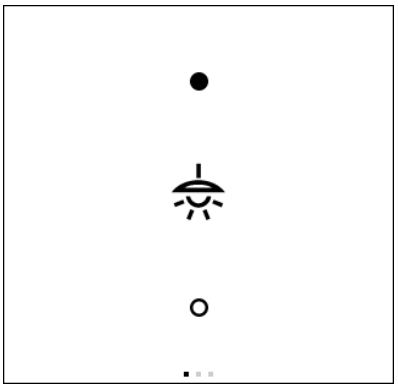


Fig. 74: Dimming RGB favourites, 1-gang

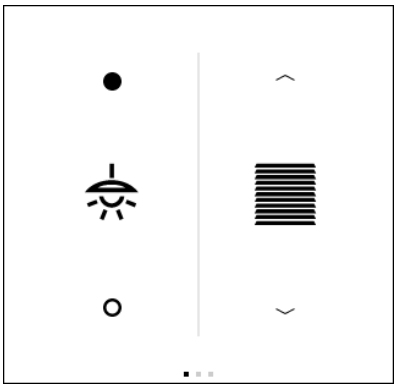


Fig. 75: Dimming RGB favourites, 2-gang

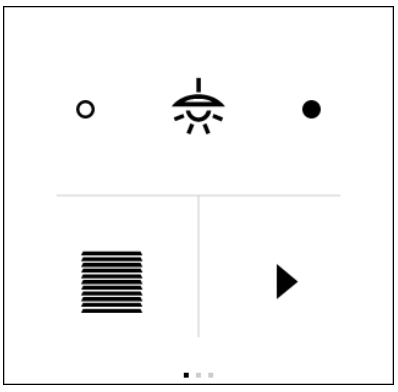


Fig. 76: Dimming RGB favourites, 3-gang top

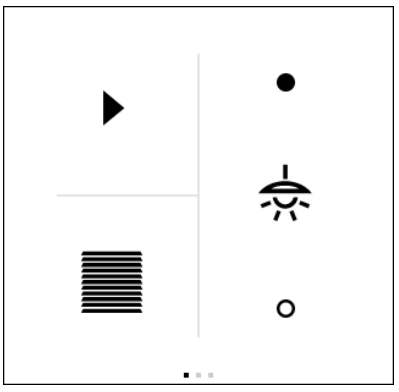


Fig. 77: Dimming RGB favourites, 3-gang right

Brief pressing of filled circle:
Increase brightness value by 5 % via the "Dimming value RGB" object

Long pressing of filled circle:
Repeatedly increase brightness value by 5 % via the "Dimming value RGB" object

Brief pressing of empty circle:
Decrease brightness value by 5 % via the "Dimming value RGB" object

Long pressing of empty circle:
Repeatedly decrease brightness value by 5 % via the "Dimming value RGB" object

Tap the centre of the control element (icon):
Switching via the "Switching" object

Press and hold the centre of the control element (icon):
Detail page 1 will be shown

10.6.2 Favourites page 3-gang (top or bottom left) or 4-gang display

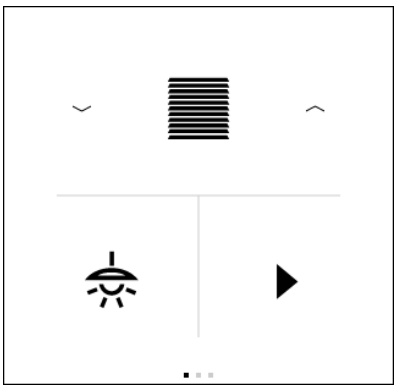


Fig. 78: Dimming RGB
Favourites, 3-gang bottom left

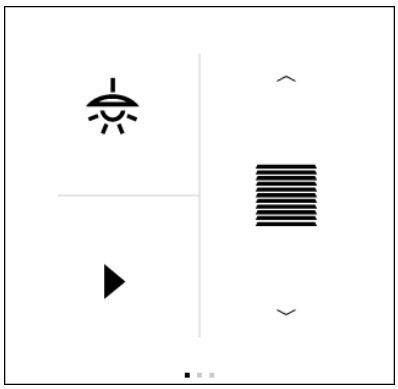


Fig. 79: Dimming RGB
Favourites, 3-gang top left

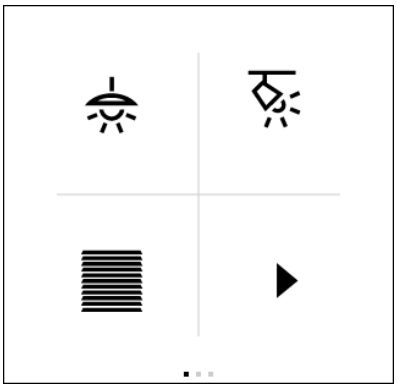


Fig. 80: Dimming RGB favourites, 4-gang

Tap the centre of the control element (icon):
Switching via the "Switching" object

Press and hold the centre of the control element (icon):
Detail page 1 will be shown

10.6.3 Detail page 1 Brightness

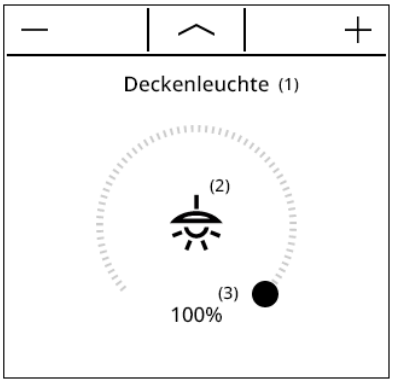


Fig. 81: Dimming RGB Detail page 1 Brightness

Pressing -:
Decrease brightness value by 1 %, repeated in bigger increments with long pressing

Pressing +:
Increase brightness value by 1 %, repeated in bigger increments with long pressing

Touch operation via the slider:
The newly selected value is transmitted via the "Brightness value" object.

10.6.4 Detail page 2 Colour

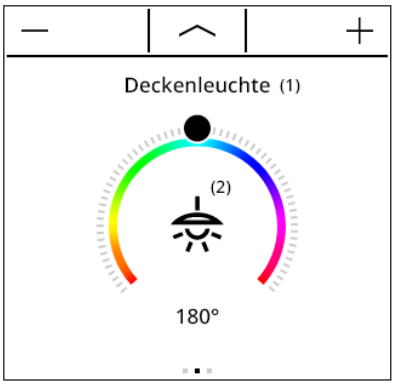


Fig. 82: Dimming RGB Detail page 2 Colour

Pressing -:
Decrease colour by 1°, repeated in bigger increments with long pressing

Pressing +:
Increase colour by 1°, repeated in bigger increments with long pressing

Touch operation via the slider:
The newly selected colour is transmitted via the "Dimming value RGB" object.

10.6.5 Detail page 3 Saturation

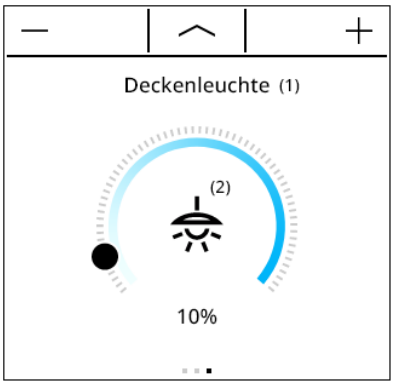


Fig. 83: Dimming RGB Detail page 3 Saturation

Pressing -:
Decrease saturation by 1 %, repeated in bigger increments with long pressing

Pressing +:
Increase saturation by 1 %, repeated in bigger increments with long pressing

Touch operation via the slider:
The newly selected saturation is transmitted via the "Dimming value RGB" object.

The following icons have 4 states for displaying the brightness value on a favourites page or on the detail page, and are therefore best suited for the "Dimming RGB" channel function.

 Lights – Bulb (light bulb)	 Lights – Ceiling (ceiling lamp)	 Lights – Floor – 1 (stand lamp)	 Lights – Floor – 2 (stand lamps)
 Lights – Floor – 3 (floor lamp)	 Lights – LED (LED panel)	 Lights – LED – 1 (LED strips floor)	 Lights – LED – 2 (LED strips ceiling)
 Lights – Mirror (mirror lamp)	 Lights – Orientation (pilot light)	 Lights – Outdoor (outdoor floor lamp)	 Lights – Outdoor – 1 (outdoor lamp)
 Lights – Outdoor – 2 (outdoor lamps)	 Lights – Pendant (pendant)	 Lights – Spot (ceiling spotlight)	 Lights – Stairs (staircase lamp)
 Lights – Stairs – Orient (staircase spotlight)	 Lights – Table (table lamp)	 Lights – Wall (wall lamp)	

10.6.6 Object list

Object no.	Function	Name	Type	DPT	Flag
19, …	Channel n – Output	Switching	1 bit	DPST-1-1	K, Ü, A
Object for transmitting switching telegrams (ON, OFF).					

Object no.	Function	Name	Type	DPT	Flag
20, …	Channel n – Input	Switching feedback	1 bit	DPST-1-1	K, S, A
Object for feedback of a switching status to the device. This affects the status text and status icon of the corresponding channel on the device, which are shown in the display area of the channel element. The feedback of the switching status must be provided by the "actively transmitting" actuator. If the controlled KNX switch actuator does not have a separate status feedback, this object must be connected to the "Channel X – Switching" object via an identical group address.					

Object no.	Function	Name	Type	DPT	Flag
23, …	Channel 1 – Output	Dimming value RGB	3 bytes	DPST-232-600	K, Ü, A
Object for transmitting RGB colour value telegrams (3 x 0 ... 255). This can be used to control a dimming actuator. The transmitted decimal data values of 3 x 0 ... 255 must be evaluated by the actuator as RGB colour values of 3 x 0 ... 100 %. On the interface, the RGB colour value is entered in the form of a brightness value in percent (0 ... 100 %), a colour value in degrees (0 ... 360°) and a contrast value in percent (0 ... 100 %) via three sliders. This is converted by the device into an RGB colour value and sent to the bus.					

Object no.	Function	Name	Type	DPT	Flag
24, …	Channel 1 – Input	RGB feedback	3 bytes	DPST-232-600	K, S, A
Object for receiving RGB value telegrams that are transmitted by a dimming actuator, for example. The RGB colour value from the bus is converted into a brightness value in percent (0 ... 100 %), a colour value in degrees (0 ... 360°) and a contrast value in percent (0 ... 100 %). These three calculated values influence the status values, status icons and the positions of the sliders of the corresponding channel on the device. The feedback of the RGB colour value must be provided by the "actively transmitting" actuator. If the controlled KNX dimming actuator does not have separate RGB colour value feedback, this object must be connected to the "Channel X – Dimming value RGB" object with the identical group address as for transmission. The decimal data values of 3 x 0 ... 255 are evaluated as RGB colour values of 3 x 0 ... 100 %, which correspond to the brightnesses of the three colours red, green and blue.					

10.7 Shutter / Awning / Blind

For each channel whose function is set to "Shutter / Awning", the ETS displays two 1-bit and two 1-byte communication objects.
For each channel whose function is set to "Blind", the ETS displays two 1-bit and four 1-byte communication objects.
When operating this function, the objects are used as follows:

10.7.1 Favourites page 1-gang, 2-gang or 3-gang display (top or right)

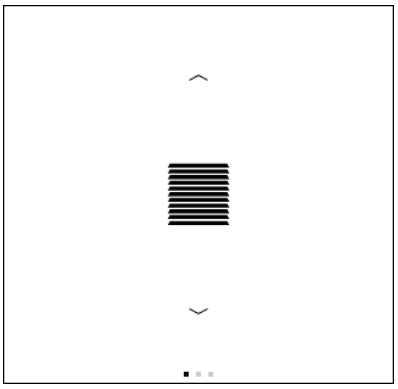


Fig. 84: Shutter / Awning / Blind
Favourites, 1-gang

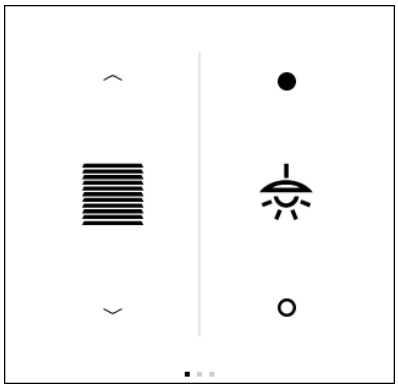


Fig. 85: Shutter / Awning / Blind
Favourites, 2-gang

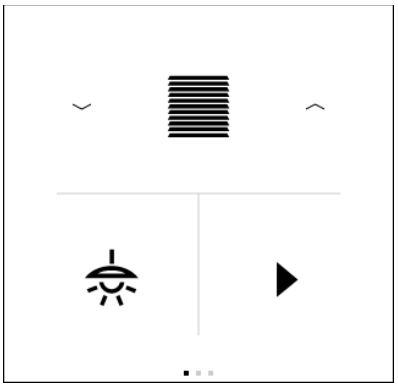


Fig. 86: Shutter / Awning / Blind
Favourites, 3-gang top

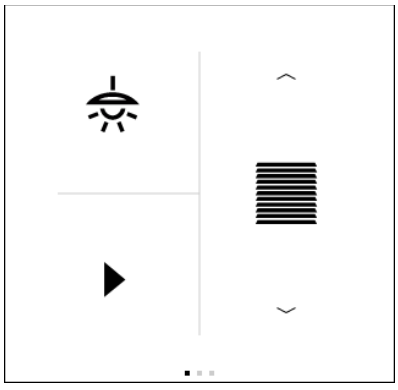


Fig. 87: Shutter / Awning / Blind
Favourites, 3-gang right

Brief actuation of up arrow:
Value "0" (up) via the "Short-time operation" object

Long actuation of up arrow:
Value "0" (up) via the "Long-term operation" object

Brief actuation of down arrow:
Value "1" (down) via the "Short-time operation" object

Long actuation of down arrow:
Value "1" (down) via the "Long-term operation" object

Tap the centre of the control element (icon):
Switching between value "0" (up) and value "1" (down) via the "Long-term operation" object

Press and hold the centre of the control element (icon):
Detail page is shown

10.7.2 Favourites page 3-gang (top or bottom left) or 4-gang display

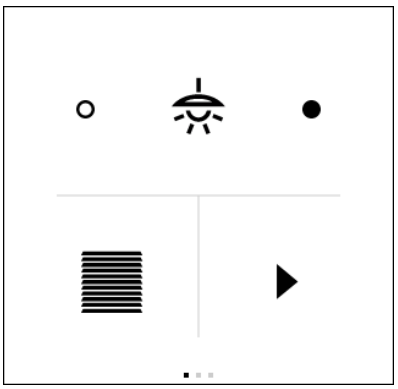


Fig. 88: Shutter / Awning / Blind
Favourites, 3-gang bottom left

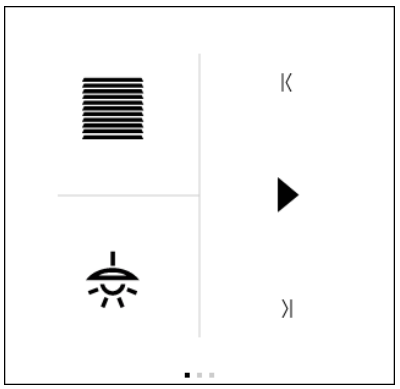


Fig. 89: Shutter / Awning / Blind
Favourites, 3-gang top left

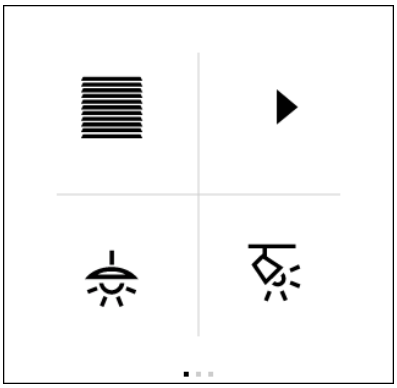


Fig. 90: Shutter / Awning / Blind favourites, 4-gang

Tap the centre of the control element (icon):
Switching between value "0" (up) and value "1" (down) via the "Long-term operation" object

Press and hold the centre of the control element (icon):
Detail page is shown

10.7.3 Detail page 1 Curtain height

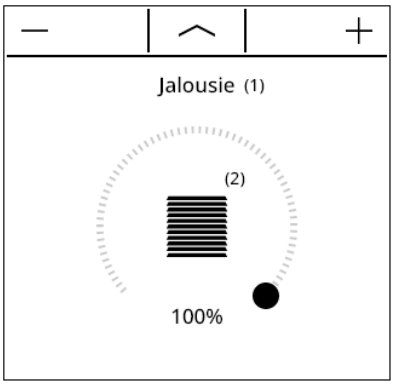


Fig. 91: Shutter / Awning / Blind Detail page 1 Curtain height

Pressing -:
Decrease curtain height by 1 %, repeated in bigger increments with long pressing

Pressing +:
Increase curtain height by 1 %, repeated in bigger increments with long pressing

Touch operation via the slider:
The newly selected value is transmitted via the "Curtain height" object

10.7.4 Detail page 2 Slat position

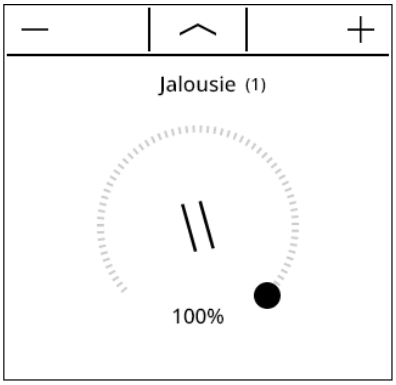


Fig. 92: Shutter / Awning / Blind Detail page 2 Slat position

Pressing -:
Decrease slat position by 1 %, repeated in bigger increments with long pressing

Pressing +:
Increase slat position by 1 %, repeated in bigger increments with long pressing

Touch operation via the slider:
The newly selected value is transmitted via the "Slat position" object

10.7.5 Icons

The following icons have 4 states to display the blind or slat position on a favourites page or on the detail page, and are therefore best suited for the "Shutter / Awning / Blind" channel function.

 Blinds – Awning (awning)	 Blinds – Door (blind – door)	 Blinds – Horizontal (blind – horizontal)
 Blinds – Slats (blind – slat)	 Blinds – Vertical (blind – vertical)	

10.7.6 Parameters

Functionality	Shutter / Awning, Blind
Here you can select whether a shutter / awning or a blind is to be controlled. When selecting "Shutter / Awning", only a detail page for the curtain height is displayed. When selecting "Blind", a detail page for the curtain height and a detail page for the slat adjustment are displayed. With this setting, the objects for adjusting the slats are also enabled. This parameter is only visible with "Function" = "Shutter / Awning / Blind".	

10.7.7 Objects

Object no.	Function	Name	Type	DPT	Flag
19, …	Channel 1 – Output	Short-time operation	1 bit	DPST-1-7	K, Ü, A
Object for sending telegrams with which a blind or shutter drive can be stopped or with which the blind slats can be adjusted briefly.					

Object no.	Function	Name	Type	DPT	Flag
20, …	Channel 1 – Output	Long-term operation	1 bit	DPST-1-8	K, Ü, A
Object for sending telegrams with which a blind or shutter drive can be moved up or down.					

Object no.	Function	Name	Type	DPT	Flag
21, …	Channel 1 – Output	Curtain height	1 bytes	DPST-5-1	K, Ü, A
Object for transmitting value telegrams (0 ... 255) for setting the curtain height. This can be used to control a curtain position object (e.g. "Blind position", "Shutter / awning position", "Ventilation flap position"...) of a blind or shutter actuator. The decimal data values 0 ... 255 transmitted must be evaluated by the actuator as percentage values 0 ... 100 %.					

Object no.	Function	Name	Type	DPT	Flag
22, …	Channel 1 – Input	Curtain height feedback	1 bytes	DPST-5-1	K, S, A
Object for receiving position feedback telegrams for the curtain height, which are emitted by a blind or shutter actuator, for example. This affects the status value, status icon and the position of the slider for the curtain height display of the corresponding channel on the device. The feedback of the position value must be provided by the "actively transmitting" actuator. The decimal data values 0 ... 255 are evaluated as percentage values 0 ... 100 % and shown on the device display.					

Object no.	Function	Name	Type	DPT	Flag
23, …	Channel 1 – Output	Slat position	1 bytes	DPST-5-1	K, Ü, A
Object for sending value telegrams (0 ... 255) for setting the slat position. This can be used to control a slat position object of a blind actuator. The decimal data values 0 ... 255 transmitted must be evaluated by the actuator as percentage values 0 ... 100 %.					

Object no.	Function	Name	Type	DPT	Flag
24, …	Channel 1 – Input	Slat position feedback	1 bytes	DPST-5-1	K, S, A
Object for receiving position feedback telegrams for the slat position, which are emitted by a blinds actuator, for example. This affects the status value, status icon and the position of the slider for slat display of the corresponding channel on the device. The feedback of the position value must be provided by the "actively transmitting" actuator. The decimal data values 0 ... 255 are evaluated as percentage values 0 ... 100 % and shown on the device display.					

10.8 Value transmitter

For each channel whose function is set to "Value transmitter", the ETS displays two communication objects (transmission and feedback).

When operating this function, the transmission object is used as follows:

10.8.1 Favourites page 1-gang, 2-gang or 3-gang display (top or right)

Fig. 93: Value transmitter favourites, 1-gang

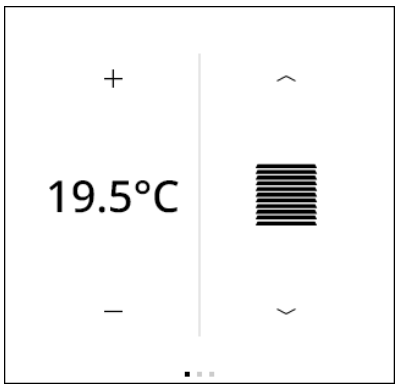


Fig. 94: Value transmitter favourites, 2-gang

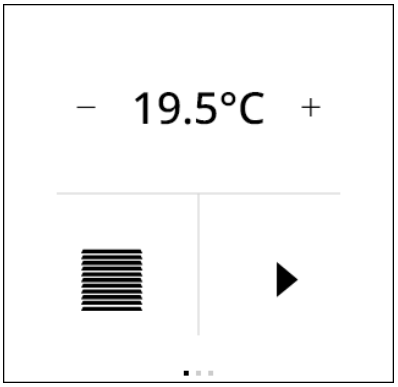


Fig. 95: Value transmitter favourites, 3-gang top

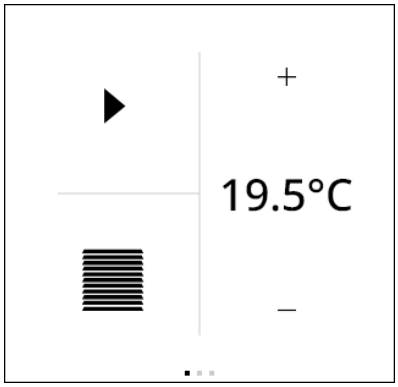


Fig. 96: Value transmitter favourites, 3-gang right

Brief pressing of +:
Increase current value with the configured increment via the "Value transmitter" object

Long pressing of +:
Repeatedly increase current value with the configured increment via the "Value transmitter" object

Brief pressing of -:
Decrease current value with the configured increment via the "Value transmitter" object

Long pressing of -:
Repeatedly decrease current value with the configured increment via the "Value transmitter" object

Tap the centre of the control element (value):
Send current value via the "Value transmitter" object

Press and hold the centre of the control element (value):
Detail page is shown

10.8.2 Favourites page 3-gang (top or bottom left) or 4-gang display

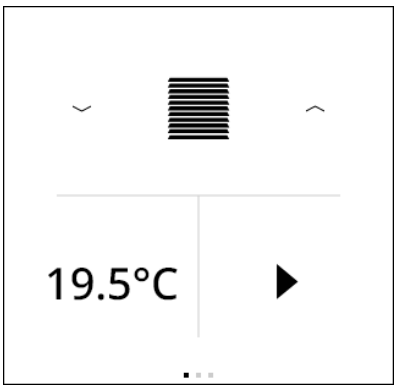


Fig. 97: Value transmitter
Favourites, 3-gang bottom left

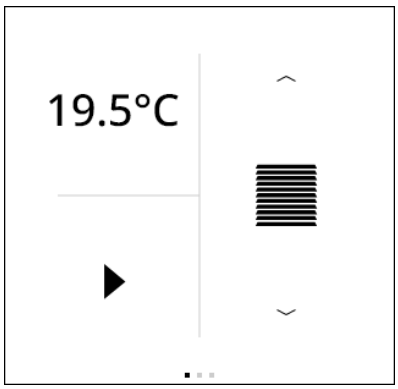


Fig. 98: Value transmitter
Favourites, 3-gang top left

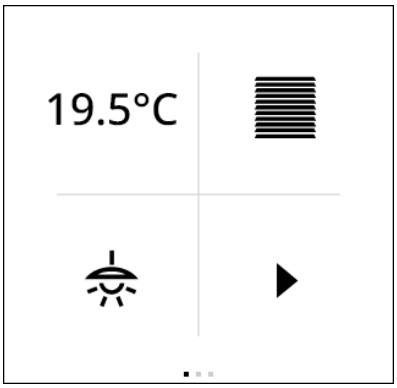


Fig. 99: Value transmitter favourites, 4-gang

Tap the centre of the control element (icon):
Send current value via the "Value transmitter" object

Press and hold the centre of the control element (value):
Detail page is shown

10.8.3 Detail page

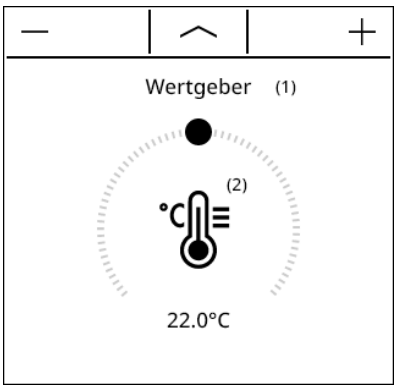


Fig. 100: Value transmitter detail page

Pressing -:
Decrease current value with the configured increment, repeated in bigger increments with long pressing

Pressing +:
Increase current value with the configured increment, repeated in bigger increments with long pressing

Touch operation via the slider:
The newly selected value is transmitted via the "Value transmitter" object

All available icons are suitable for this function, as no status is indicated for a value transmitter on the favourites page, but only the current value is displayed.

10.8.4 Parameters

Functionality	**1-byte (0 ... 100 %) (DPT 5.001), 1-byte (0 ... 360°) (DPT 5.003), 1-byte (0 ... 255) (DPT 5.010), 1-byte (-128...127) (DPT 6.010), 2-byte (0 ... 65535) (DPT 7.001), 2-byte (-32768...32767) (DPT 8.001), 2-byte floating point value (DPT 9.XXX)**
The data type for the value transmitter can be parameterised here. The data type of the value transmitter object is adjusted according to this parameter. This parameter is only visible with "Function" = "Value transmitter".	

Minimum value	**-32768 ... 32767**
The minimum value sets the lower limit for the slider on the device. This means that only values that are greater than or equal to the minimum value can be specified for the value transmitter on the device. This parameter is only visible with "Function" = "Value transmitter".	

Maximum value	**-32768 ... 32767**
The maximum value sets the upper limit for the slider on the device. This means that only values that are less than or equal to the maximum value can be specified for the value transmitter on the device. This parameter is only visible with "Function" = "Value transmitter".	

Increment	-32768 ... 100 ... 32767
The value in this parameter determines the minimum resolution for the value specification. Furthermore, pressing the plus or minus button increases or decreases the current value by the specified value. This parameter is only visible with "Function" = "Value transmitter".	

Unit	free text with max. 3 characters Default: empty
The unit parameterised here is shown via the touch display of the device after the selected value. This parameter is only visible if "Function" = "Value transmitter" and if "1-byte (0 ... 255)", "1-byte (-128 ... 127)", "2-byte (0 ... 65535)", "2-byte (-32768 ... 32767)" or "2-byte floating point value" is selected for "Function".	

10.8.5 Objects

Object no.	Function	Name	Type	DPT	Flag
19, …	Channel 1 – Output	Value transmitter (0 ... 100 %)	1 byte	DPST-5-1	K, Ü, A
Object for sending value telegrams (0 ... 100 %). It can be used e.g. to control a brightness value object or a curtain position object.					

Object no.	Function	Name	Type	DPT	Flag
20, …	Channel 1 – Input	Value transmitter feedback (0 ... 100 %)	1 byte	DPST-5-1	K, S, A
Object for receiving value feedbacks that are transmitted e.g. by an actuator that has been addressed. This affects the status value, status icon and the position of the slider for value display of the corresponding channel on the device. The feedback of the value must be provided by the "actively transmitting" actuator. If the controlled bus device does not have a feedback function, this object must be connected to the corresponding object "Channel X – Value transmitter" with the identical group address as for transmission.					

Object no.	Function	Name	Type	DPT	Flag
19, …	Channel 1 – Output	Value transmitter (0 ... 255)	1 byte	DPST-5-10	K, Ü, A
Object for sending value telegrams (0 ... 255). It can be used e.g. to control a brightness value object or a curtain position object.					

Object no.	Function	Name	Type	DPT	Flag
20, …	Channel 1 – Input	Value transmitter feedback (0 ... 255)	1 byte	DPST-5-10	K, S, A
Object for receiving value feedbacks that are transmitted e.g. by an actuator that has been addressed. This affects the status value, status icon and the position of the slider for value display of the corresponding channel on the device. The feedback of the value must be provided by the "actively transmitting" actuator. If the controlled bus device does not have a feedback function, this object must be connected to the corresponding object "Channel X – Value transmitter" with the identical group address as for transmission.					

Object no.	Function	Name	Type	DPT	Flag
19, …	Channel 1 – Output	Value transmitter (-128 ... 127)	1 byte	DPST-6-10	K, Ü, A
Object for sending value telegrams (-128 ... 127).					

Object no.	Function	Name	Type	DPT	Flag
20, …	Channel 1 – Input	Value transmitter feedback (-128 ... 127)	1 byte	DPST-6-10	K, S, A
Object for receiving value feedbacks that are transmitted e.g. by an actuator that has been addressed. This affects the status value, status icon and the position of the slider for value display of the corresponding channel on the device. The feedback of the value must be provided by the "actively transmitting" actuator. If the controlled bus device does not have a feedback function, this object must be connected to the corresponding object "Channel X – Value transmitter" with the identical group address as for transmission.					

Object no.	Function	Name	Type	DPT	Flag
19, …	Channel 1 – Output	Value transmitter (0 ... 255 %)	1 byte	DPST-5-4	K, Ü, A
Object for sending value telegrams (0 ... 255 %).					

Object no.	Function	Name	Type	DPT	Flag
20, …	Channel 1 – Input	Value transmitter feedback (0 ... 255 %)	1 byte	DPST-5-4	K, S, A
Object for receiving value feedbacks that are transmitted e.g. by an actuator that has been addressed. This affects the status value, status icon and the position of the slider for value display of the corresponding channel on the device. The feedback of the value must be provided by the "actively transmitting" actuator. If the controlled bus device does not have a feedback function, this object must be connected to the corresponding object "Channel X – Value transmitter" with the identical group address as for transmission.					

Object no.	Function	Name	Type	DPT	Flag
19, …	Channel 1 – Output	Value transmitter (0 ... 360°)	1 byte	DPST-5-3	K, Ü, A
Object for sending value telegrams (0 ... 360°).					

Object no.	Function	Name	Type	DPT	Flag
20, …	Channel 1 – Input	Value transmitter feedback (0 ... 360°)	1 byte	DPST-5-3	K, S, A
Object for receiving value feedbacks that are transmitted e.g. by an actuator that has been addressed. This affects the status value, status icon and the position of the slider for value display of the corresponding channel on the device. The feedback of the value must be provided by the "actively transmitting" actuator. If the controlled bus device does not have a feedback function, this object must be connected to the corresponding object "Channel X – Value transmitter" with the identical group address as for transmission.					

Object no.	Function	Name	Type	DPT	Flag
23, …	Channel 1 – Output	Value transmitter (0 ... 65535)	2 bytes	DPST-7-1	K, Ü, A
Object for sending value telegrams (0 ... 65535).					

Object no.	Function	Name	Type	DPT	Flag
24, …	Channel 1 – Input	Value transmitter feedback (0 ... 65535)	2 bytes	DPST-7-1	K, S, A
Object for receiving value feedbacks that are transmitted e.g. by an actuator that has been addressed. This affects the status value, status icon and the position of the slider for value display of the corresponding channel on the device. The feedback of the value must be provided by the "actively transmitting" actuator. If the controlled bus device does not have a feedback function, this object must be connected to the corresponding object "Channel X – Value transmitter" with the identical group address as for transmission.					

Object no.	Function	Name	Type	DPT	Flag
23, …	Channel 1 – Output	Value transmitter (-32768 ... 32767)	2 bytes	DPST-8-1	K, Ü, A
Object for sending value telegrams -32768 to 32767.					

Object no.	Function	Name	Type	DPT	Flag
24, …	Channel 1 – Input	Value transmitter feedback (-32768 ... 32767)	2 bytes	DPST-8-1	K, S, A
Object for receiving value feedbacks that are transmitted e.g. by an actuator that has been addressed. This affects the status value, status icon and the position of the slider for value display of the corresponding channel on the device. The feedback of the value must be provided by the "actively transmitting" actuator. If the controlled bus device does not have a feedback function, this object must be connected to the corresponding object "Channel X – Value transmitter" with the identical group address as for transmission.					

Object no.	Function	Name	Type	DPT	Flag
23, …	Channel 1 – Output	2-byte floating point value value transmitter	2 bytes	DPST-9-XXX	K, Ü, A
Object for sending 2-byte floating point values.					

Object no.	Function	Name	Type	DPT	Flag
24, …	Channel 1 – Input	2-byte floating point value value transmitter feedback	2 bytes	DPST-9-XXX	K, S, A
Object for receiving value feedbacks that are transmitted e.g. by an actuator that has been addressed. This affects the status value, status icon and the position of the slider for value display of the corresponding channel on the device. The feedback of the value must be provided by the "actively transmitting" actuator. If the controlled bus device does not have a feedback function, this object must be connected to the corresponding object "Channel X – Value transmitter" with the identical group address as for transmission.					

10.9 Scene extension

For each channel whose function is set to "Scene extension", the ETS displays one 1-byte communication object.

When operating this function, the object is used as follows:

10.9.1 Favourites page 1-gang, 2-gang or 3-gang display (top or right)

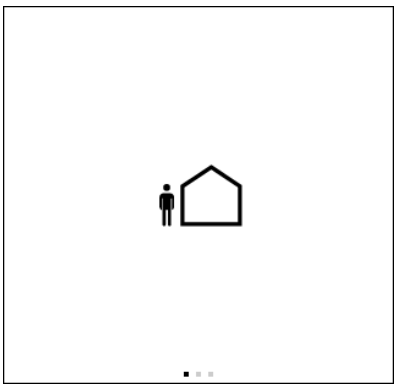


Fig. 101: Scene extension
Favourites, 1-gang

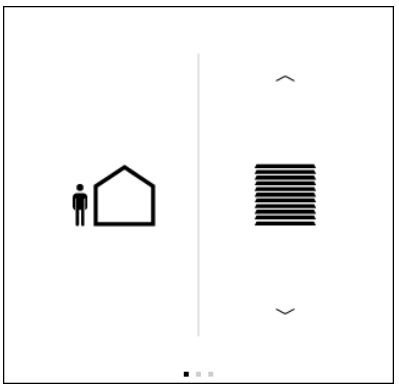


Fig. 102: Scene extension
Favourites, 2-gang

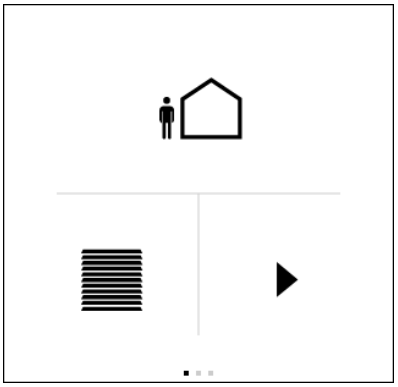


Fig. 103: Scene extension
Favourites, 3-gang top

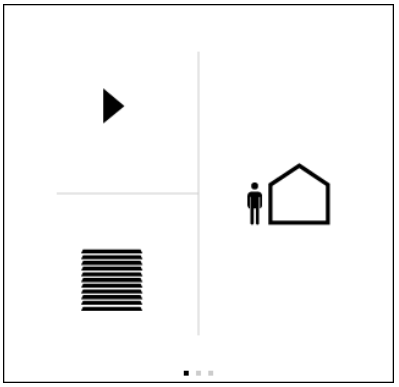


Fig. 104: Scene extension
Favourites, 3-gang right

Tap the centre of the control element (icon):
Send configured scene number via the "Scene extension" object

10.9.2 Favourites page 3-gang (top or bottom left) or 4-gang display

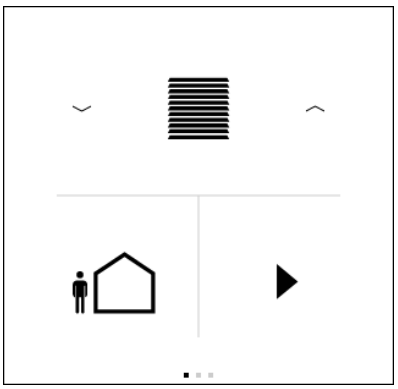


Fig. 105: Scene extension
Favourites, 3-gang bottom left

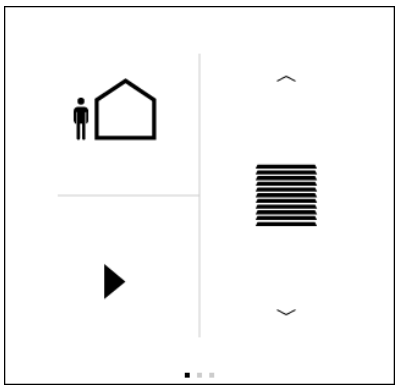


Fig. 106: Scene extension
Favourites, 3-gang top left

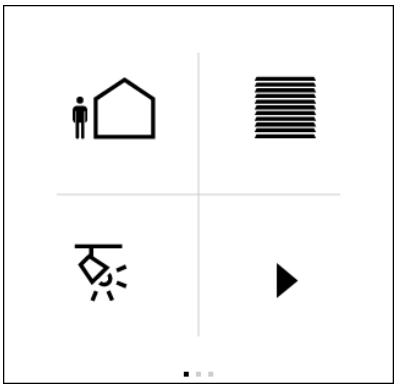


Fig. 107: Scene extension favourites, 4-gang

Tap the centre of the control element (icon):
Send configured scene number via the "Scene extension" object

10.9.3 Detail page

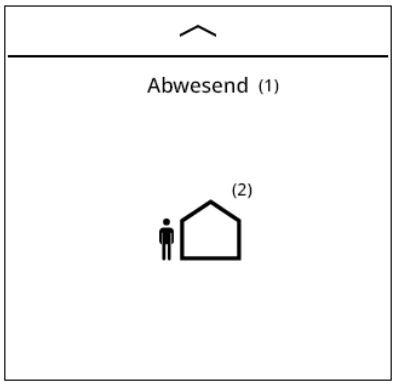


Fig. 108: Scene extension detail page

Tap the centre of the control element (icon):
Send configured scene number via the "Scene extension" object

All available icons are suitable for this function, as no status is indicated for a scene call, but only a static icon is displayed on the favourites page and detail page.

10.9.4 Parameters

Scene number	1 ... 64
The scene number to be transmitted when sending the "Scene extension" object is parameterised at this point. This parameter is only visible with "Function" = "Scene extension".	

10.9.5 Objects

Object no.	Function	Name	Type	DPT	Flag
19, …	Channel 1 – Output	Scene extension	1 byte	DPST-18-1	K, Ü, A
Object for calling up one of a maximum of 64 scenes to a scene touch sensor. The transmitted value is set in the "Scene number" parameter.					

11. Multimedia

A predefined multimedia page is available for convenient operation of a music zone. The favourites page can be used to start or stop the music system and to select the next or previous music track. The detail page displays the artist, title and playlist in text format and allows the volume to be adjusted.

A prerequisite for this function is a link between the KNX and music system. The JUNG Smart Visu Server provides the connection to the music system as an interface to Sonos.

When operating this function, the objects are used as follows:

11.1 Favourites page 1-gang, 2-gang or 3-gang display (top or right)

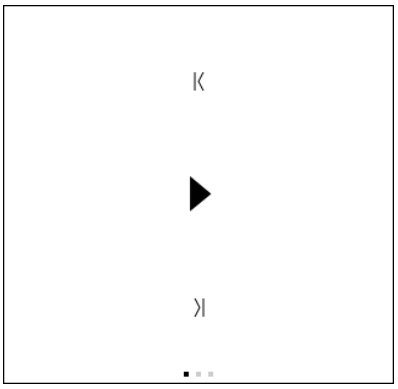


Fig. 109: Multimedia favourites, 1-gang

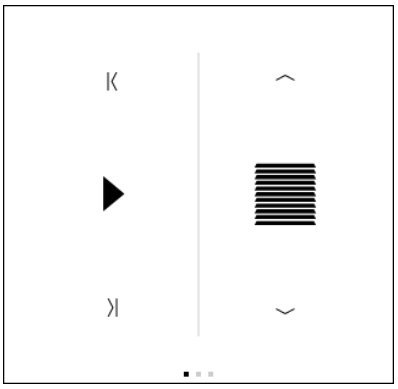


Fig. 110: Multimedia favourites, 2-gang

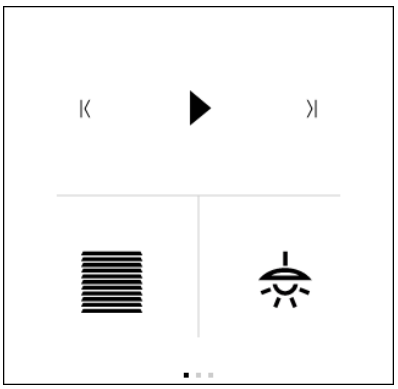


Fig. 111: Multimedia Favourites, 3-gang top

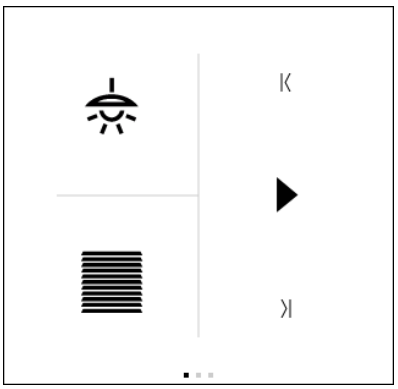


Fig. 112: Multimedia Favourites, 3-gang right

Actuation left arrow:
Value "0" via the "Previous title" object
Value "1" via the "Next title" object

Actuation right arrow:
Value "1" via the "Previous title" object
Value "0" via the "Next title" object

Tap the centre of the control element (icon):
Switching via the "Playback start / stop" object

11.2 Favourites page 3-gang (top or bottom left) or 4-gang display

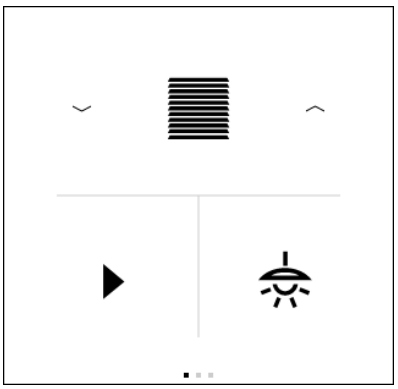


Fig. 113: Multimedia
Favourites, 3-gang bottom left

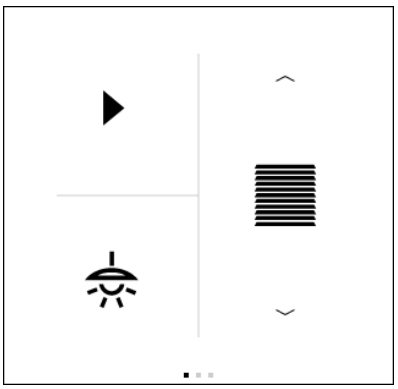


Fig. 114: Multimedia
Favourites, 3-gang top left

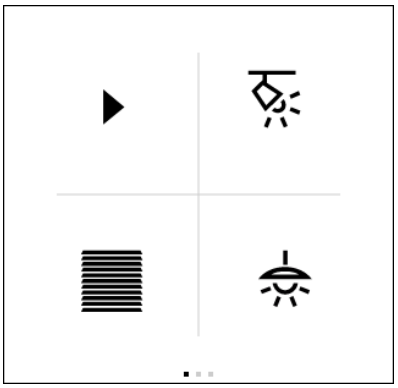


Fig. 115: Multimedia favourites, 4-gang

Tap the centre of the control element (icon):
Switching via the "Playback start / stop" object

11.3 Detail page 1 Playback and information

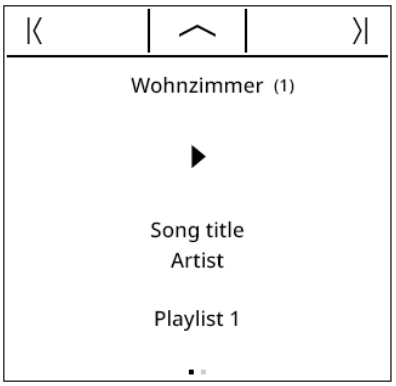


Fig. 116: Multimedia Detail page 1 Playback and information

Actuation left arrow:
Value "0" via the "Previous title" object
Value "1" via the "Next title" object

Actuation right arrow:
Value "1" via the "Previous title" object
Value "0" via the "Next title" object

Tap the centre of the control element (icon):
Switching via the "Playback start / stop" object

Text elements at the bottom of the detail page:
Title, artist and playlist

11.4 Detail page 2 Volume

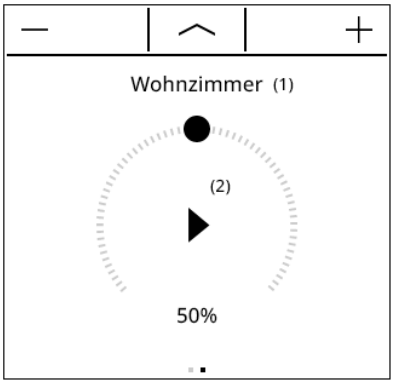


Fig. 117: Multimedia Detail page 2 Volume

Touch operation of the slider:
The newly selected volume is sent via the "Volume" object

11.5 Parameters

Inscription	**free text with max. 28 characters** **Default: empty**
The text is displayed as the heading of the multimedia page. In addition, the text entered in this parameter is taken over in the object names.	

11.6 Objects

Object no.	Function	Name	Type	DPT	Flag
211	Multimedia – Output	Start / stop playback	1 bit	DPST-1-10	K, Ü, A
Object for sending telegrams with which a playback device can be started or stopped. Value definition: "0" = stop, "1" = start.					

Object no.	Function	Name	Type	DPT	Flag
212	Multimedia – Output	Next title	1 bit	DPST-1-17	K, Ü, A
Object for sending telegrams with which the next title is selected on a playback device. The object is always sent with the value 1 and the value cannot be parameterised. When the previous title is selected, the object is sent with the value 0.					

Object no.	Function	Name	Type	DPT	Flag
213	Multimedia – Output	Previous title	1 bit	DPST-1-17	K, Ü, A
Object for sending telegrams with which the previous track is selected on a playback device. The object is always sent with the value 1 and the value cannot be parameterised. When the next title is selected, the object is sent with the value 0.					

Object no.	Function	Name	Type	DPT	Flag
214	Multimedia – Output	Volume	1 byte	DPST-5-1	K, Ü, A
Object for sending percentage values (0 ... 255) that are used to set the volume of a playback device.					

Object no.	Function	Name	Type	DPT	Flag
215	Multimedia – Input	Title artist	14 bytes	DPST-16-1	K, S, A
Object for receiving a character string for a title artist, which is transmitted e.g. by an addressed playback device. The character string from the telegram is displayed on the multimedia page of the interface under the position for the title artist. Each of the 14 bytes of the telegram is interpreted as a UTF-8 coded character and displayed on the device display.					

Object no.	Function	Name	Type	DPT	Flag
216	Multimedia – Input	Title	14 bytes	DPST-16-1	K, S, A
Object for receiving a character string for a title, which is transmitted e.g. by an addressed playback device. The character string from the telegram is displayed on the multimedia page of the interface under the position for the title. Each of the 14 bytes of the telegram is interpreted as a UTF-8 coded character and displayed on the device display.					

Object no.	Function	Name	Type	DPT	Flag
217	Multimedia – Input	Playlist	14 bytes	DPST-16-1	K, S, A
Object for receiving a character string for a playlist, which is transmitted e.g. by an addressed playback device. The character string from the telegram is displayed on the multimedia page of the interface under the position for the playlist. Each of the 14 bytes of the telegram is interpreted as a UTF-8 coded character and displayed on the device display.					

12. Room temperature control

A controller can be used for individual room temperature control. Depending on the operating mode, the current temperature setpoint value and the room temperature, actuating variables for heating or cooling control and for fan control can be transmitted to the KNX. As a rule, these control values are then evaluated by a suitable KNX actuator system, e.g. heating or switch actuators via thermal actuators or bus-compatible KNX valve drives acting directly on the valve, and converted into physical values for room climate control.

12.1 Operating modes and operating mode switching

12.1.1 Introduction

The room thermostat essentially distinguishes between two operating modes. The operating modes determine whether the controller should control heating systems ("Heating" individual operating mode) or cooling systems ("Cooling" individual operating mode) through its control value. It is also possible to activate mixed operation, where the controller can switch between "Heating" and "Cooling" either automatically or alternatively controlled via a communication object. The "Operating mode" parameter in the "Room temperature control" parameter branch defines the operating mode.

12.1.2 "Heating" or "Cooling" individual operating modes

In the "Heating" or "Cooling" individual operating modes, the controller always works with only one control value. Depending on the determined room temperature and the specified set temperatures of the operating modes (see chapter Operating mode switching), the room thermostat decides independently whether heating or cooling energy is required and calculates the control value for the heating or cooling system.

12.1.3 "Heating and cooling" mixed operating mode

In the "Heating and cooling" mixed operating mode, the controller is able to control heating and cooling systems. The switching behaviour of the operating modes can be specified.

- "Switching between heating and cooling" parameter in the "Room temperature control" parameter branch set to "automatic".
  In this case, a heating or a cooling mode is automatically activated depending on the determined room temperature and the specified temperature base setpoint or the dead zone. If the room temperature is within the set dead zone, neither heating nor cooling is carried out (both control variables = "0"). Cooling takes place if the room temperature is higher than the temperature setpoint for cooling. Heating takes place if the room temperature is lower than the temperature setpoint for heating. In the case of an automatic switchover of the operating mode, the information about whether the controller is working in heating mode ("1" telegram) or in cooling mode ("0" telegram) can be actively output to the bus via the "Heating / cooling switching" object. A telegram is transmitted when switching from heating to cooling (object value = "0") or from cooling to heating (object value = "1"). In addition, the object value can be output cyclically in the case of automatic switching. The "Heating / cooling switching cyclical transmission" parameter enables cyclical transmission (setting factor > "0") and defines the cycle time. In the case of automatic operating mode switching, please note that there may be constant switching between heating and cooling if the dead zone is set too small! For this reason, the dead zone (temperature difference between the set temperatures for heating and cooling comfort mode) should not be set lower than the standard value (2 K) if possible.
- "Switching between heating and cooling" parameter in the "Room temperature control" parameter branch set to "via object".
  In this case, the operating mode is controlled via the "Heating / cooling switching" object, regardless of the dead zone. This type of switching may be necessary, for example, if both heating and cooling is to be provided by a one-pipe system (combined heating and cooling system). For this purpose, the temperature of the medium in the one-pipe system must first be changed by the system control. The

operating mode is then set via the object (often in the one-pipe system cooling is done with cold water in summer and heating with hot water in winter). The "Heating / cooling switching" object has the following polarity: "1": Heating; "0": Cooling. After a reset, the object value is "0" and the "Heating / cooling operating mode after reset" set in the ETS is activated. The "Heating / cooling operating mode after reset" parameter can be used to define which operating mode is activated after a reset. With the settings "Heating" or "Cooling", the controller activates the parameterised operating mode immediately after the initialisation phase. With the "Operating mode before reset" parameterisation, the operating mode that was set before the reset is activated. When switching via the operating mode object, the system first switches to the operating mode specified after reset. Only when the device receives an object update does it switch to the other operating mode, if necessary.

Simultaneous heating and cooling (both internal control values > "0" calculated) is not possible. Only with PWM could a "control value overlap" occur briefly at the transition between heating and cooling due to the adjustment of the control value at the end of a time cycle. However, this overlap is corrected at the end of a PWM time cycle.

12.1.4 Heating / cooling message

Depending on the set operating mode, separate objects can be used to signal whether heating or cooling energy is currently being requested by the controller, and thus whether heating or cooling is active. As long as the control value for heating is > "0", a "1" telegram is transmitted via the "Heating" message object. The message telegram is only reset ("0" telegram is transmitted) when the control value = "0". The same applies to the message object for cooling.

ⓘ In the case of 2-point control, please note that the message objects for heating or cooling already become active as soon as the temperature setpoint of the active operating mode is undershot for heating or exceeded for cooling. The parameterised hysteresis is not taken into account!

The message objects can be enabled by the parameters "Message heating" and "Message cooling" in the parameter branch "Room temperature control → Control value and status output". The control algorithm controls the message objects.

12.2 Control algorithms and control value calculation

12.2.1 Introduction

To provide comfortable temperature control in a residential or commercial space, a special control algorithm is required to control the installed heating or cooling systems. In this way, the controller determines control variables that control the heating or cooling system, taking into account the set temperature specifications as well as the actual room temperature. The control system (control loop) consists of the room thermostat, the valve drive or the switch actuator (when using electrothermal drives ETA), the actual heating or cooling element (e.g. radiator or cooling ceiling) and the room. This results in a controlled system.

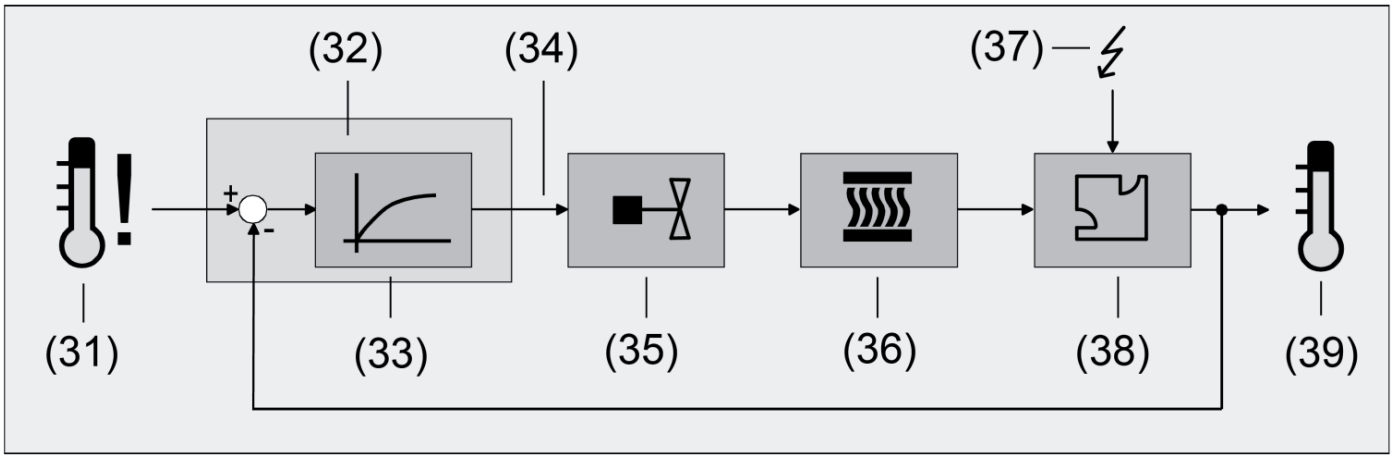


Fig. 118: Controlled system of individual room temperature control

(31) Set temperature specification
(32) Room thermostat
(33) Control algorithm
(34) Control value
(35) Valve control (valve drive, ETA, heating actuator, ...)
(36) Heat / cold exchanger (radiator, cooling ceiling, fan coil, ...)
(37) Disturbance variable (sunlight, outside temperature, lighting systems, ...)
(38) Room
(39) Actual temperature (room temperature)

The controller measures the actual temperature (39) and compares it with the set temperature specified (31). The control value (34) is calculated from the difference between the actual temperature and the set temperature with the help of the set control algorithm (34). The control value controls valves or fans for heating or cooling systems (35), whereby heating or cooling energy in the heat or cold exchangers (36) is delivered to the room (38). By regularly adjusting the control value, the controller is able to compensate for setpoint / actual temperature differences in the control loop caused by external influences (37). In addition, the flow temperature of the heating or cooling circuit has an effect on the controlled system, which means that control variable adjustments are necessary.

The room thermostat allows either proportional / integral control (PI) as a continuous or switching version or alternatively a switching 2-point control.

The control values calculated by the control algorithm are output via the communication objects "Control value heating" or "Control value cooling". Depending on the control algorithm selected for heating and / or cooling mode, the format of the control value objects is defined, among other things. In this way, 1-bit or 1-byte control value objects can be created. The control algorithm is defined by the "Type of heating control" or "Type of cooling control" parameters in the "Room temperature control" parameter branch.

12.2.2 Continuous PI control

PI control is an algorithm that consists of a proportional and an integral part. By combining these control characteristics, the fastest and most accurate control of the room temperature is achieved with no or only slight control deviations.
With this algorithm, the room thermostat calculates a new continuous control value and outputs it to the bus via a 1-byte value object when the calculated control value is changed by a specified percentage. The parameter "Automatic transmission on change by ..." in the parameter branch "Room temperature control → Control value and status output" defines the change interval in percent.

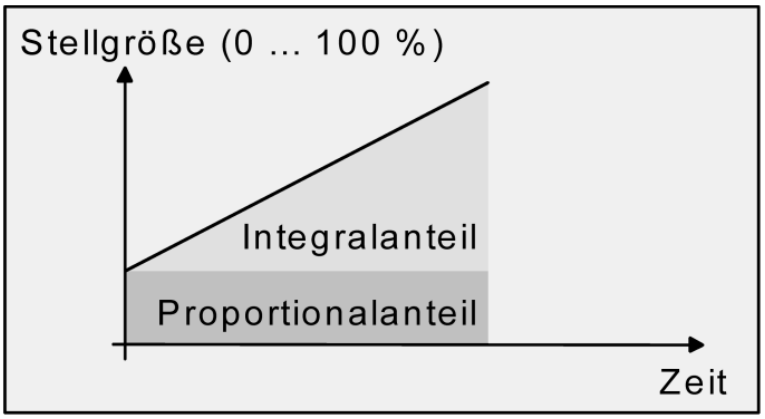


Fig. 119: Continuous PI control

12.2.3 Switching PI control

The room temperature is also maintained for this type of control using the PI control algorithm. Averaged over time, the behaviour of the control system is the same as with a continuous controller. The difference to continuous control lies exclusively in the control value output. The control value calculated by the algorithm is converted internally into an equivalent pulse width-modulated (PWM) control value signal and output to the bus via a 1-bit switching object after the cycle time has elapsed. The average value of the control value signal resulting from this modulation is a measure for the averaged valve position of the control valve and thus a reference for the set room temperature, taking into account the cycle time that can be set by the parameter "Cycle time of the switching control value ..." in the parameter branch "Room temperature control → Control value and status output".
A change of the average value and thus a change of the heating power is achieved by changing the duty cycle of the switch-on and switch-off pulse of the control value signal. The duty cycle is adjusted by the controller depending on the calculated control value exclusively at the end of a time period! Every change in the control value is implemented, regardless of the ratio by which the control value changes (the parameters "Automatic transmission on change by ..." and "Cycle time for automatic transmission ..." are non-functional here).
The last control value calculated in an active time period is implemented. Even if the set temperature is changed, for example by switching the operating mode, the control value is only adjusted at the end of an active cycle time. The following figure shows the output control value switching signal in relation to the internally calculated control value (first 30 %, then 50 % control value; control value output not inverted).

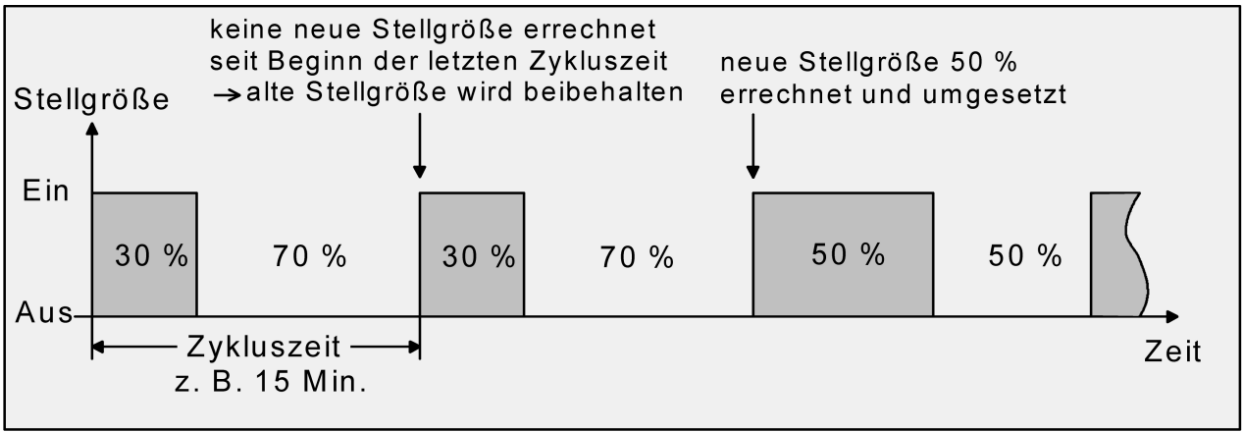


Fig. 120: Switching PI control

With a control value of 0 % (permanently switched off) or 100 % (permanently switched on), a control value telegram according to the control value ("0" or "1") is always output after a cycle time has elapsed. With a switching PI control, the controller always calculates internally with continuous control values. These continuous values can additionally be output to the bus via a separate 1-byte value object, for example for visualisation purposes as status information. All PWM controls use the same cycle time.

Cycle time:
In most cases, the pulse width-modulated control values are used to control electrothermal drives (ETA). In this case, the room thermostat sends the switching control value telegrams to an actuator with semiconductor switching elements to which the drives are connected (e.g. heating actuator). By setting the cycle time of the PWM signal on the controller, it is possible to adapt the control to the drives used. The cycle time determines the switching frequency of the pulse width-modulated signal and allows adaptation to the adjustment cycle times of the actuators used (travel time required by the actuator to adjust the valve from the fully closed position to the fully open position). In addition to the adjustment cycle time, the dead time (time in which the valve drives show no reaction when switched on or off) must be taken into account. If different drives with different adjustment cycle times are used, the greater of the times must be taken into account. The manufacturer's specifications for the drives must always be observed.

In general, there are two different cases when configuring the cycle time:

Case 1: Cycle time > 2 x adjustment cycle time of the electrothermal drives (ETA) used

In this case, the switch-on or switch-off times of the PWM signal are so long that the drives have sufficient time to fully open or close in one time period.

Advantages:
The desired average value for the control value and thus the required room temperature is set relatively accurately even with several drives controlled simultaneously.

Disadvantages:
Please note that the life expectancy of the drives may decrease due to the full valve lift that has to be continuously performed. In some circumstances, with very long cycle times (> 15 minutes) and a lower inertia of the system, the heat output to the room near the radiators can be uneven and perceived as a nuisance.

ⓘ This setting for the cycle time is recommended for slowly responding heating systems (e.g. underfloor heating systems).

ⓘ This setting is also recommended for a larger number of potentially different actuators, so that the travels of the valves can be better averaged.

Case 2: Cycle time < adjustment cycle time of the electrothermal drives (ETA) used

In this case, the switch-on or switch-off times of the PWM signal are so short that the drives do not have sufficient time to fully open or close in one time period.

Advantages:
This setting ensures a continuous flow of water through the radiators and thus enables an even heat output to the room. If only one valve drive is controlled, it is possible for the controller to compensate for the average value adjustment caused by the short cycle time by continuously adjusting the control value and thus set the desired room temperature.

Disadvantages:
If more than one drive is controlled at the same time, the desired average value for the control value and thus the required room temperature is set only very poorly or with greater deviations.
Due to the continuous flow of water through the valve and thus the constant heating of the drive, the dead times of the drives change during the opening and closing phases. Due to the short cycle time and taking into account the dead times, the required control value (average value) is only set with a potentially larger deviation. To ensure that the room temperature can be set at a constant level after a certain time, the controller must compensate for the average value adjustment caused by the short cycle time by continuously adjusting the control value. Usually, the control algorithm implemented in the controller (PI control) ensures that control deviations are compensated.

This cycle time setting is recommended for fast reacting heating systems (e.g. panel radiators).

12.2.4 2-point control

The 2-point control is a very simple type of temperature control. With this control, two hysteresis temperature values are specified. The actuators are controlled by the controller via switch-on and switch-off control value commands (1 bit). A continuous control value is not calculated with this type of control.
The advantage of the very simple 2-point room temperature control is offset by the disadvantage of the constantly fluctuating temperature with this control. For this reason, no fast-acting heating or cooling systems should be controlled by a 2-point control, as this can lead to the temperature being overshot considerably and thus to a decline in comfort. When setting the hysteresis limits values, the operating modes must be distinguished.

"Heating" or "Cooling" individual operating modes:
The controller switches on the heating in heating mode when the room temperature has fallen below a set limit. In heating mode, the control only switches the heating off again once a set temperature limit has been exceeded.
In cooling mode, the controller switches on cooling when the room temperature has exceeded a set limit. The cooling is only switched off again once the temperature has fallen below a set limit. Depending on the switching status, the control value "1" or "0" is output if the hysteresis limit values are exceeded or not reached.
The hysteresis limit values of both operating modes can be configured in the ETS.

ⓘ Please note that the message objects for heating or cooling already become active as soon as the temperature setpoint of the active operating mode is undershot for heating or exceeded for cooling. The hysteresis is not taken into account!

The following two figures each show a 2-point control for the individual operating modes "Heating" or "Cooling". The figures take into account two temperature setpoints, single-stage heating or cooling and a non-inverted control value output.

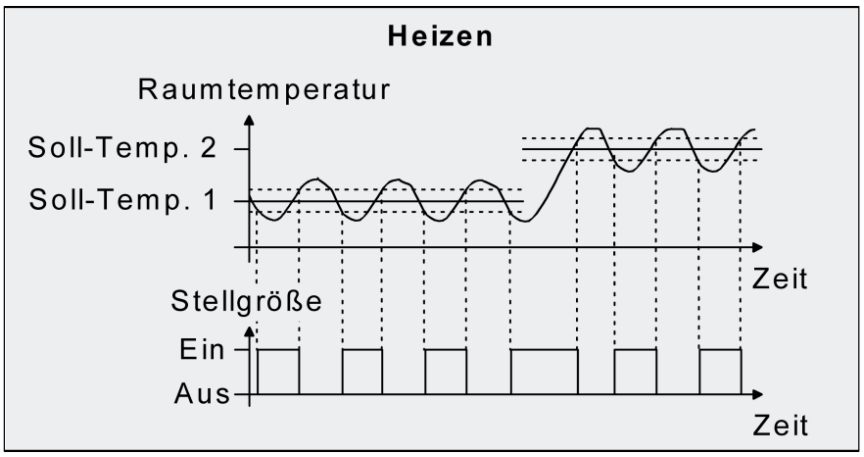


Fig. 121: 2-point control for "Heating" individual operating mode

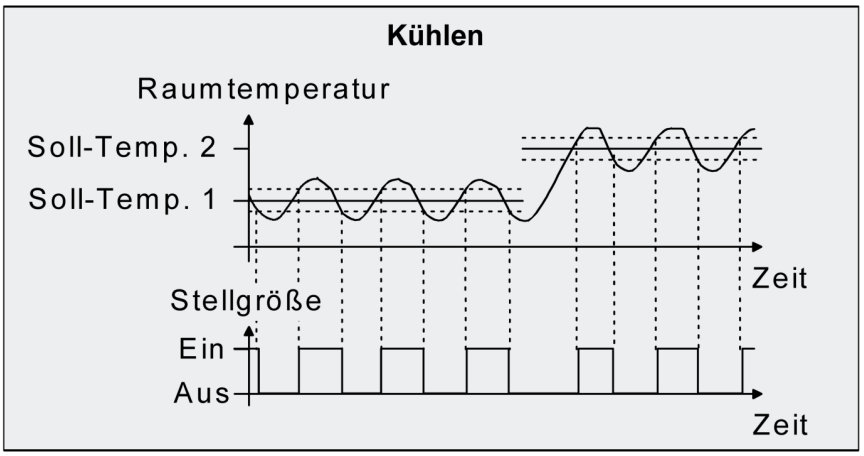


Fig. 122: 2-point control for "Cooling" individual operating mode

"Heating and cooling" mixed operating mode:
In mixed mode, a distinction is made as to whether the switching of the operating modes for heating or cooling is automatic or controlled via the object.

With automatic operating mode switching, the controller switches on the heating in heating mode when the room temperature has fallen below a set hysteresis limit. In this case, the control switches off the heating in heating mode as soon as the room temperature exceeds the temperature setpoint of the active operating mode. Similarly, in cooling mode, the controller switches on cooling when the room temperature has exceeded a set hysteresis limit. In cooling mode, the control switches off the cooling as soon as the room temperature falls below the temperature setpoint of the active operating mode. Thus, in mixed mode, there is no longer an upper hysteresis limit value for heating or a lower hysteresis limit value for cooling, as these values would be in the dead zone. Within the dead zone, there is neither heating nor cooling.

With operating mode switching via the object, the controller switches on the heating in heating mode when the room temperature has fallen below a set hysteresis limit. In heating mode, the control only switches the heating off again once the set upper hysteresis limit has been exceeded. Similarly, in cooling mode, the controller switches on cooling when the room temperature has exceeded a set hysteresis limit. In cooling mode, the control only switches the cooling off again once the set lower hysteresis limit has been undershot. As with the "Heating or cooling" individual operating modes, there are two hysteresis limit values per operating mode. Although the dead zone for calculating the temperature setpoints for cooling also exists, the dead zone has no influence on the calculation of the 2-point control value, since the operating mode is switched exclusively "manually" via the corresponding object. Thus, it is possible within the hysteresis that heating or cooling energy is still requested even at temperature values that are in the dead zone.

ⓘ Even with automatic operating mode switching, an upper hysteresis limit value for heating and a lower hysteresis limit value for cooling can be parameterised in the ETS for a 2-point control, however, these do not have any function.

The following two figures show a 2-point control for the "Heating and cooling" mixed operating mode differentiated between heating and cooling mode. The figures take into account two temperature setpoints, a non-inverted control value output and automatic operating mode switching. When switching the operating mode via the object, an upper hysteresis for heating and a lower hysteresis for cooling can also be parameterised.

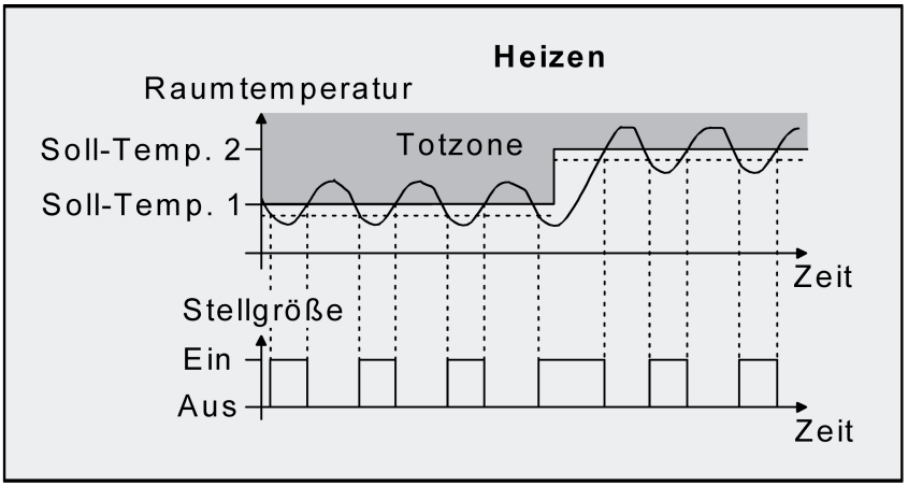


Fig. 123: 2-point control for "Heating and cooling" mixed operating mode with active heating mode

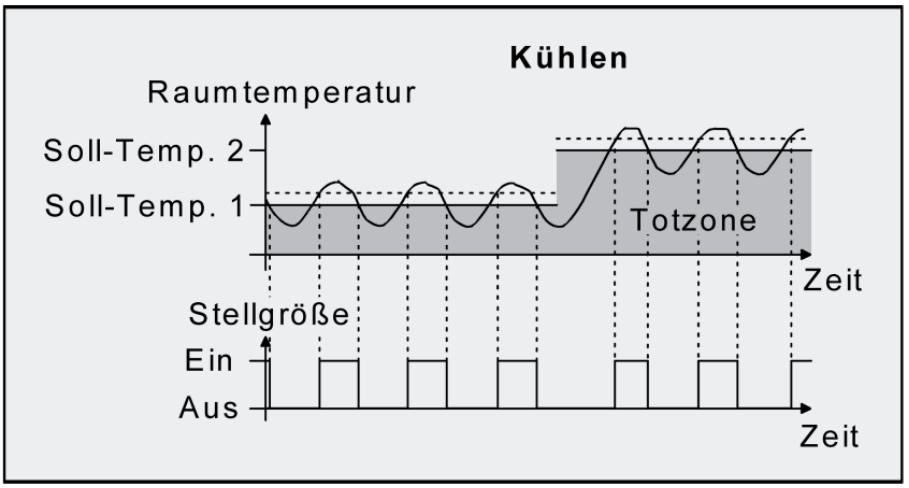


Fig. 124: 2-point control for "Heating and cooling" mixed operating mode with active cooling mode

Depending on the switching status, the control value "1" or "0" is output if the hysteresis limit values or the setpoint values are exceeded or not reached.

ⓘ Please note that the message objects for heating or cooling already become active as soon as the temperature setpoint of the active operating mode is undershot for heating or exceeded for cooling. The hysteresis is not taken into account!

12.3 Adjusting the control algorithms

12.3.1 Adjusting the PI control

There are various systems that can heat or cool a room. For example, it is possible to heat or cool the environment evenly using heat transfer media (preferably water or oil) in conjunction with room air convection. These types of systems are used with wall radiators, underfloor heating or cooling ceilings, for example.
Alternatively or additionally, fan systems can heat or cool rooms. In most cases, such systems are electric fan heaters, fan coolers or cooling compressors with fans. Due to the direct heating of the room air, these heating or cooling systems are fairly quick.

In order for the PI control algorithm to efficiently control all common heating or cooling systems and thus for the room temperature control to function as quickly as possible and without control deviation, an adjustment of the control parameters is required. With PI control, certain factors can be set for this purpose that significantly influence the control behaviour. For this reason, the room thermostat can be set to predefined "experience values" for the most common heating or cooling systems. If a satisfactory control result is not achieved with the specified values by selecting a corresponding heating or cooling system, the adjustment can optionally be optimised via control parameters.
The "Type of heating" or "Type of cooling" parameters set predefined control parameters for the heating or cooling stage. These fixed values correspond to practical values of a properly planned and executed air conditioning system and result in an optimal behaviour of the temperature control. The heating or cooling modes shown in the following tables can be set for heating or cooling operation.

Predefined control parameters and recommended control types for heating systems:

Type of heating	Proportional range (preset)	Reset time (preset)	Recommended PI control mode	Recommended PWM cycle time
Hot water heating	5 Kelvin	150 minutes	continuous / PWM	15 minutes
Underfloor heating system	5 Kelvin	240 minutes	PWM	15 to 20 minutes
Electric heating	4 Kelvin	100 minutes	PWM	10 to 15 minutes
Fan coil unit	4 Kelvin	90 minutes	continuous	–
Split unit (split air conditioner)	4 Kelvin	90 minutes	PWM	10 to 15 minutes

Predefined control parameters and recommended control types for cooling systems:

Type of cooling	Proportional range (preset)	Reset time (preset)	Recommended PI control mode	Recommended PWM cycle time
Cooling ceiling	5 Kelvin	240 minutes	PWM	15 to 20 minutes
Fan coil unit	4 Kelvin	90 minutes	continuous	–
Split unit (split air conditioner)	4 Kelvin	90 minutes	PWM	10–15 minutes

If the parameters "Type of heating" or "Type of cooling" are set to "via control parameters", it is possible to adjust the control parameters. By specifying the proportional range for heating or cooling (P component) and the reset time for heating or cooling (I component), the control can be significantly affected.

ⓘ Even changing a control parameter by small values leads to a significantly different control behaviour!
ⓘ The starting point for the adjustment should be the control parameter setting of the corresponding heating or cooling system according to the fixed values listed in the tables.

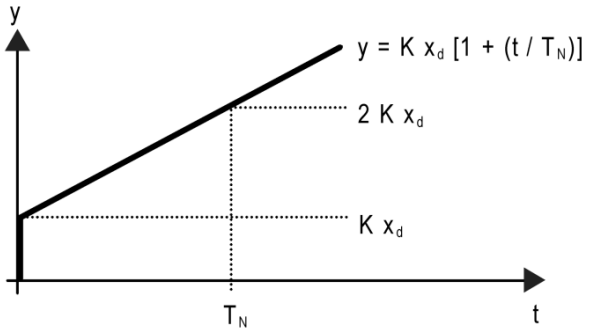


Fig. 125: Function of the control value of a PI control

y: control value
x_d: control difference ($x_d = x_{setpoint} - x_{actual}$)
P = 1/K: parameterisable proportional range
K = 1/P: gain factor
T_N: parameterisable reset time

PI control algorithm: control value $y = K\ x_d\ [1 + (t/T_N)]$

By deactivating the reset time (setting = "0") → P control algorithm: control value $y = K\ x_d$

Effects of the settings on the control parameters:

Parameter settings	Effect
P: small proportional range	Large overshoot in case of setpoint changes (possibly also continuous oscillation), fast adjustment to the setpoint value
P: large proportional range	no (or little) overshoot but slow adjustment
T_N: short reset time	Fast adjustment of control deviations (ambient conditions), danger of continuous oscillations
T_N: long reset time	Slow adjustment of control deviations

12.3.2 Adjusting the 2-point control

The 2-point control is a very simple type of temperature control. With this control, two hysteresis temperature values are specified. The upper and lower temperature hysteresis limits can be set by parameters. Please take into account that

- a small hysteresis leads to lower temperature fluctuations but a higher bus load,
- a large hysteresis switches less frequently, but causes discomforting temperature fluctuations.

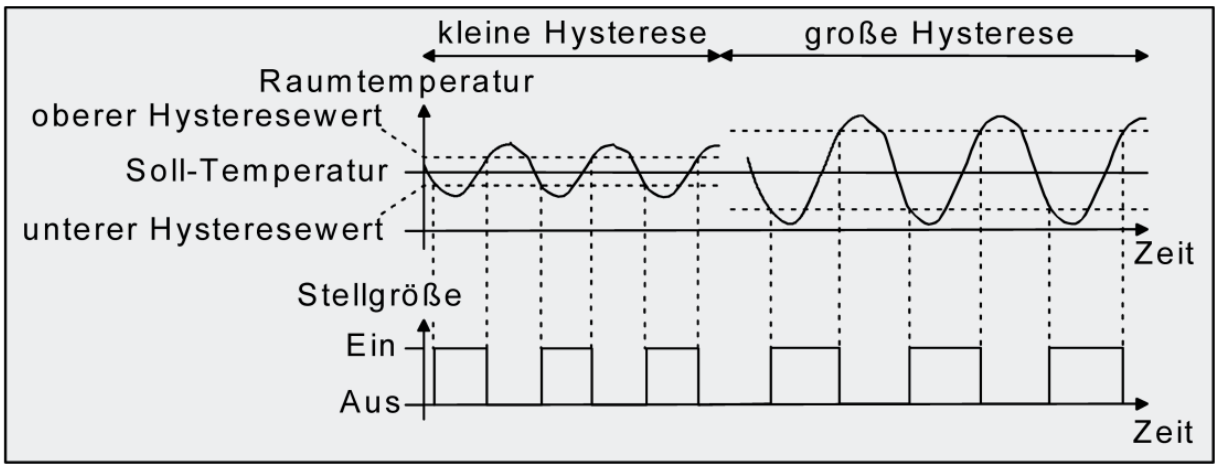


Fig. 126: Effects of hysteresis on the switching behaviour of the control value of a 2-point control

12.4 Switching operating mode

12.4.1 Introduction – The operating modes

The room thermostat distinguishes between different operating modes. For example, by activating these modes, it is possible to activate different temperature setpoints depending on the time of day or week day, or depending on whether someone is present or on the status of the heating or cooling system. The following operating modes are distinguished:

Comfort mode
The comfort mode is generally activated when there are people in a room and for this reason the room temperature must be set to a comfortable and appropriate value. Switching to this operating mode can be done by specifying an operating mode via "Switching operating mode", for example by using a PIR detector on the wall or presence detector on the ceiling.

Standby mode
If a room is not in use during the day because there are no people in the room, standby mode can be activated. This allows the room temperature to be adjusted to a standby value, thus saving heating or cooling energy.

Night mode
At night or during longer absences, it is usually recommended to adjust the room temperature to cooler temperatures with heating systems (e.g. in bedrooms). In this case, cooling systems can be set to higher temperature values if air conditioning is not required (e.g. in offices). Night mode can be activated for this purpose.

Frost / heat protection operation
Frost protection is required if, for example, the room temperature must not fall below critical values when the window is open. Heat protection may become necessary when the temperature becomes too high in an environment that is usually always warm due to external influences. In these cases, freezing or overheating of the room can be prevented by activating the frost / heat protection depending on whether the "Heating" or "Cooling" operating mode is set by specifying a dedicated temperature setpoint.

Switching operating mode
The operating modes can be switched via the touch display (favourites page or display page of the room thermostat) on the device or via the 1-byte "Switching operating mode" value object.

The device shows the currently set operating mode on the display. The currently set operating mode is transmitted to the bus via the "Currently active operating mode" object.

A common 1-byte switching object is available for all operating modes. This value object can be used during the running time to switch operating modes immediately after receiving only one telegram. The value received determines the operating mode. In addition, a second 1-byte object is available that can set an operating mode, independent of all other switching options, in a forced-controlled and superordinate manner. Both 1-byte objects are implemented according to the KNX specification. Taking into account the priority, a certain switching hierarchy results from operating mode switching with the objects.

The status of the windows in the room can be evaluated via the "Window status" object, which allows the controller to switch to frost / heat protection operation when the windows are open in order to save energy, regardless of the primary operating mode set.

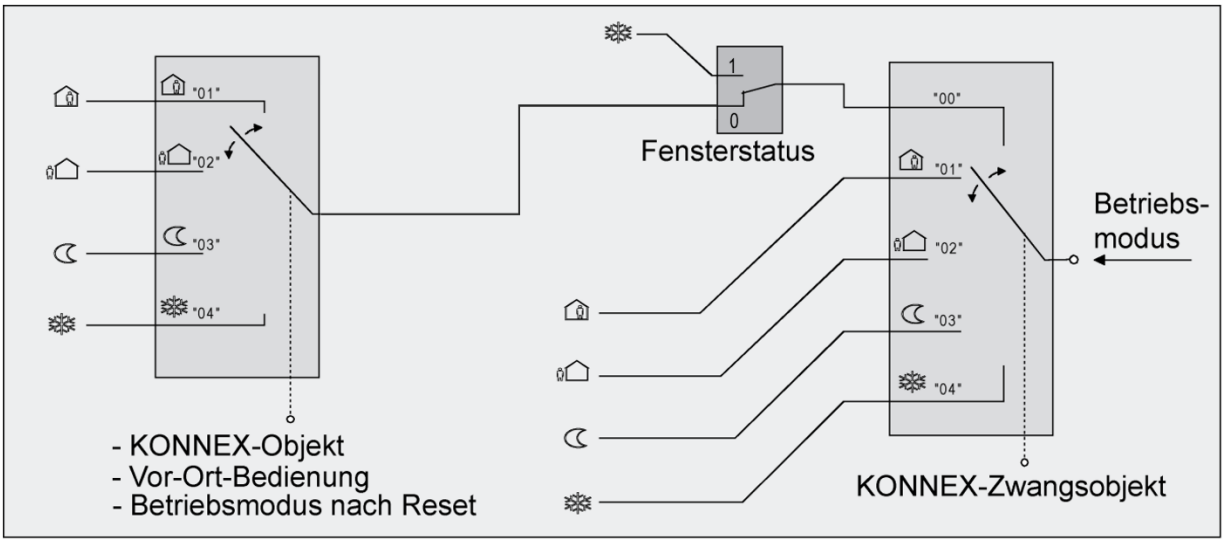


Fig. 127: Switching operating mode by KNX object

States of the communication objects and the resulting operating modes:

Switching operating mode object value	Object value Forced object operating mode	Window status object	resulting operating mode
00	00	0	No change
01	00	0	Comfort mode
02	00	0	Standby mode
03	00	0	Night mode
04	00	0	Frost / heat protection
X	00	1	Frost / heat protection
X	01	X	Comfort mode
X	02	X	Standby mode
X	03	X	Night mode
X	04	X	Frost / heat protection

X = Status irrelevant

ⓘ When switching an operating mode, for example by on-site operation, the KNX switching object is updated by the controller and can be read out if the "Read" flag is set. If the "Transmit" flag is set for this object, the current value is also automatically sent out on the bus when it is changed. After bus voltage return or after initialisation of the controller, the value corresponding to the set operating mode is actively transmitted to the bus if the "Transmit" flag is set. When using controller extensions, the "Transmit" flag must always be set!

ⓘ Switching by the KNX object "Switching operating mode" is equal to switching locally on the device. An operating mode specified by the object (e.g. by a controller extension) can therefore be adjusted by operating mode switching on the device if a higher-priority mode (e.g. window contact) as well as the KNX forced object is not activated. The KNX forced object always has the highest priority.

12.4.2 Further information on the window status and the automatic frost protection

The room thermostat has various options for switching to frost / heat protection. In addition to switching by the corresponding operating mode switching object, frost / heat protection can be activated by a window contact or, alternatively, frost protection can be activated by an automatic temperature control. The window contact or the automatic control is assigned the higher priority. The "Frost / heat protection" parameter in the "Room temperature control → RTR – General" parameter branch determines how the switching to forced frost / heat protection takes place:

Frost / heat protection switching "via window status":
The 1-bit object "Window status" is enabled. A telegram with the value = "ON" (opened window) to this object activates the frost / heat protection. If this is the case, the operating mode cannot be deactivated. Only a telegram with the value = "OFF" (closed window) resets the window status and deactivates the frost / heat protection. Subsequently, the operating mode set before opening the window or the operating mode monitored via the bus while the window is open is activated.
The window status is active in heating and cooling mode. After a bus voltage failure or ETS programming operation, the window status is always inactive.

Frost protection switching with "Frost protection automatic operation":
With this setting, it is possible to automatically switch to frost protection temporarily depending on the determined room temperature. If there are no window contacts, this setting can prevent unnecessary heating of a room when windows or outside doors are open. With this function, a rapid drop in temperature can be detected by measuring the actual temperature every minute, such as that caused by an open window in the winter months. The "Frost protection automatic temperature reduction" parameter sets the maximum temperature reduction for frost protection switching in K/min. If the controller detects that the room temperature changes by at least the configured temperature jump within one minute, frost protection is activated.

After the time specified by the parameter "Frost protection duration automatic operation" has elapsed, the controller automatically switches back to the operating mode set before frost protection or to the operating mode monitored during automatic operation. Retriggering of an elapsing frost protection duration is not possible.
The KNX forced object has a higher priority than the automatic frost protection and can interrupt it.

ⓘ The automatic frost protection only affects heating operation for temperatures below the set temperature of the set operating mode. Thus, no automatic frost protection switching can take place in the "Heating and cooling" operating mode at room temperatures in the dead zone or in active cooling mode. Automatic activation of the heat protection is not provided for with this parameterisation.

ⓘ When a window is open or when the automatic frost protection is active, the controller operating mode cannot be switched via the display. Operation is then not monitored after closing the window or at the end of the automatic frost protection.

ⓘ If there is a frequent draught in a room, the frost protection may be activated / deactivated unintentionally if the automatic frost protection is activated and the temperature reduction is set too low. Therefore, switching to frost / heat protection by window contacts is preferable to automatic operation.

12.4.3 Further information on the operating mode after reset

In the ETS, in the "Room temperature control" parameter node, the "Operating mode after reset" parameter can be used to specify which operating mode is to be activated after bus voltage return or after an ETS programming operation. The following settings are possible:

"Restore operating mode before reset" → The mode set before a reset according to operating mode objects is restored after the initialisation phase of the device. Operating modes that were set by a function with a higher priority before the reset (forced or window status) are not monitored.

"Comfort operation" → After the initialisation phase, comfort operation is activated.

"Standby operation" → After the initialisation phase, standby operation is activated.

"Night operation" → After the initialisation phase, night operation is activated.

"Frost/heat protection operation" → After the initialisation phase, frost / heat protection is activated.

The objects associated with the activated operating mode are updated after a reset.

12.5 Temperature setpoints

12.5.1 Set temperature setting

The "Comfort mode setpoint (basic set temperature)" parameter on the "Room temperature control → Setpoints" parameter page specifies the basic setpoint that is loaded as the specified value when the device is programmed by the ETS. The temperature setpoints for standby and night operation are derived from this value, taking into account the parameters "Reducing / increasing the set temperature in standby operation" or "Reducing / increasing the set temperature in night operation" depending on the heating or cooling operating mode. In the "Heating and cooling" operating mode, the dead zone is also taken into account. It is possible to change the basic temperature and thus also all dependent set temperatures during operation of the device by means of the 2-byte object "Basic setpoint". A change via the object must always be enabled in the ETS by setting the parameter "Change of setpoint value of basic temperature" to "Allow via bus". The "Basic setpoint value" object is hidden in the event of a non-permitted basic setpoint value adjustment via the bus.

The setpoint value for comfort mode (basic set temperature) can be changed via the detail page of the temperature controller, whereby the setpoint values for standby and night operation also change, as the setpoint values for standby and night operation are derived from the basic set temperature.

If standby or night operation is activated, the corresponding setpoint value can be changed via the detail page of the temperature controller, since it is not the basic set temperature that is changed, but the value of the reduction or increase. This changes the increase or decrease between comfort operation (basic set temperature) and the activated operating mode.

If you then change the setpoint value for comfort operation (basic set temperature) again, the newly configured increase or adjustment between the different operating modes is retained.

ⓘ The minimum and maximum set temperature settings can be configured in the ETS.
These limit values are automatically also the setpoint values for frost protection and heat protection, and cannot be subsequently adjusted during operation of the controller.

The temperature setpoints programmed into the room thermostat by the ETS during commissioning can be changed during operation of the device via communication objects. In the ETS, the parameter "Overwrite control settings in the device during ETS programming process" on the parameter page "Room temperature control" can be used to specify whether the setpoint values that are present in the device and may have been subsequently changed are overwritten during an ETS programming process and thus replaced again by the values parameterised in the ETS. If this parameter is set to "Yes", the temperature setpoints are deleted during a programming process in the device and replaced by the values of the ETS. If this parameter is configured to "No", the setpoint values present in the device remain unchanged. The set temperatures entered in the ETS are then irrelevant.

ⓘ During initial commissioning of the device, the parameter "Overwrite control settings in the device during ETS programming process" must be set to "Yes" in order to correctly initialise the storage locations in the device. The "Yes" setting is also required if essential controller properties (operating mode, setpoint specification, etc.) are changed in the ETS by new parameter configurations!

12.5.2 Set temperature settings with relative setpoint specification

Depending on the operating mode, a distinction must be made between different cases in the relative set temperature setting, which have an effect on the temperature derived from the basic setpoint value.

Setpoint values for "Heating" operating mode

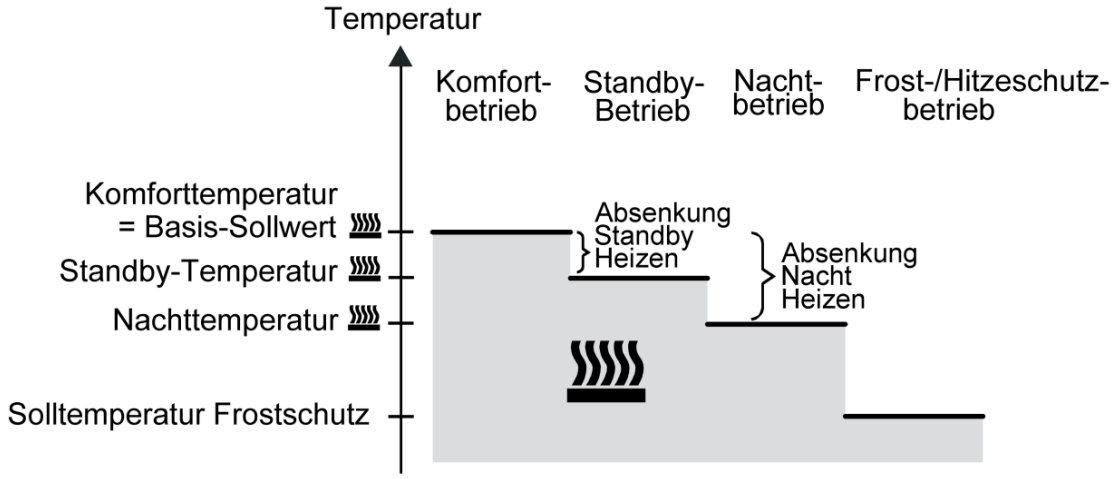


Fig. 128: Set temperatures in the "Heating" operating mode

In this operating mode, the set temperatures for comfort, standby and night operation are available and the frost protection temperature can be specified. The following applies:

$T_{\text{Standby setpoint heating}} \leq T_{\text{Comfort setpoint heating}}$

or

$T_{\text{Night setpoint heating}} \leq T_{\text{Comfort setpoint heating}}$

The standby and night set temperatures are derived from the comfort set temperature (basic setpoint value) according to the reduction temperatures parameterised in the ETS. Frost protection is intended to prevent the heating system from freezing. For this reason, the frost protection temperature (default: +7 °C) should be set lower than the night temperature.
In principle, however, it is possible to select values between +7.0 °C and +40.0 °C for the frost protection temperature. The possible value range of a set temperature is between +7.0 °C and +45 °C for "Heating" and is limited in the lower range by the frost protection temperature (min. set temperature setting) and in the upper range by the heat protection set temperature (max. set temperature setting).

Setpoint values for "Cooling" operating mode

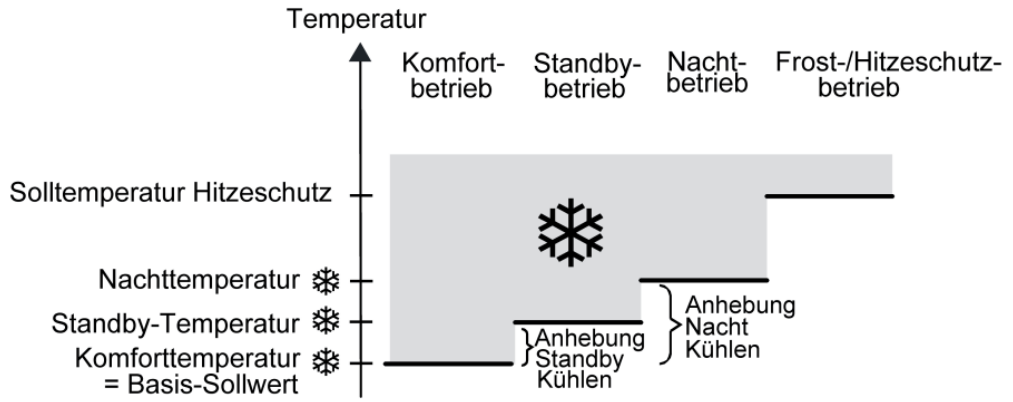


Fig. 129: Set temperatures in the "Cooling" operating mode

In this operating mode, the set temperatures for comfort, standby and night operation are available and the heat protection temperature can be specified. The following applies:

$T_{\text{Comfort setpoint cooling}} \leq T_{\text{Standby setpoint cooling}}$

or

$T_{\text{Comfort setpoint cooling}} \leq T_{\text{Night setpoint cooling}}$

The standby and night set temperatures are derived from the comfort set temperature (basic setpoint value) according to the increase temperatures parameterised. Heat protection is intended to ensure that a maximum permissible room temperature is not exceeded in order to protect system parts if necessary. For this reason, the heat protection temperature (default: +35 °C) should be set higher than the night temperature. In principle, however, it is possible to select values between +7.0 °C and +45.0 °C for the heat protection temperature. The possible value range of a set temperature is between 7.0 °C and +45.0 °C for "Cooling" and is limited in the upper range by the heat protection temperature (max. set temperature setting).

Setpoint values for "Heating and cooling" operating mode

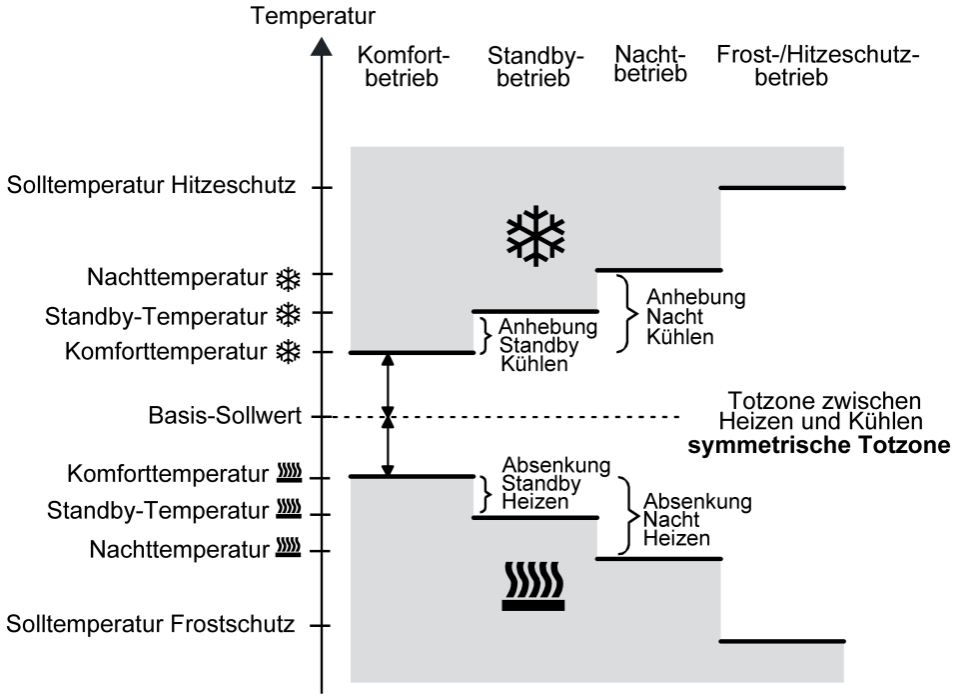


Fig. 130: Set temperatures in the "Heating and cooling" operating mode with symmetrical dead zone

In this operating mode, the set temperatures for comfort, standby and night operation of both operating modes as well as the dead zone are available. For combined heating and cooling, a distinction is also made for the dead zone position, which is always symmetrical. In addition, the frost protection and heat protection temperatures can be specified. The following applies:

$T_{\text{Standby setpoint heating}} \leq T_{\text{Comfort setpoint heating}} \leq T_{\text{Comfort setpoint cooling}} \leq T_{\text{Standby setpoint cooling}}$

or

$T_{\text{Night setpoint heating}} \leq T_{\text{Comfort setpoint heating}} \leq T_{\text{Comfort setpoint cooling}} \leq T_{\text{Night setpoint cooling}}$

The standby and night set temperatures are derived from the comfort set temperatures for heating or cooling. The temperature increase (for cooling) and the temperature reduction (for heating) of both operating modes can be specified in the ETS. The comfort temperatures are derived from the dead zone and the basic setpoint value.

Frost protection is intended to prevent the heating system from freezing. For this reason, the frost protection temperature (default: +7 °C) should be set lower than the night temperature for heating. In principle, however, it is possible to select values between +7.0 °C and +40.0 °C for the frost protection temperature.

Heat protection is intended to prevent a maximum permissible room temperature from being exceeded in order to protect system parts if necessary. For this reason, the heat protection temperature (default: +35 °C) should be set higher than the night temperature for cooling. In principle, however, it is possible to select values between +7.0 °C and +45.0 °C for the heat protection temperature.

The possible value range of a setpoint temperature is between +7.0 °C and +45.0 °C for "Heating and cooling" and is limited in the lower range by the frost protection temperature and in the upper range by the heat protection temperature.

Dead zone and dead zone position in the combined heating and cooling operating mode

The comfort set temperatures for heating and cooling are derived from the basic setpoint value, taking into account the set dead zone. The dead zone (temperature zone in which neither heating nor cooling takes place) is the difference between the comfort set temperatures.

The parameters "Dead zone between heating and cooling", "Dead zone position" and "Basic temperature after reset" are specified in the ETS configuration.

The dead zone specified in the ETS is split into two parts at the basic setpoint. From the resulting half dead zone, the comfort set temperatures are derived directly from the basic setpoint.

The following applies:

$T_{\text{Basic setpoint}} - ½\ T_{\text{Dead zone}} = T_{\text{Comfort setpoint heating}}$

and

$T_{\text{Basic setpoint}} + ½\ T_{\text{Dead zone}} = T_{\text{Comfort setpoint cooling}}$
$\rightarrow T_{\text{Comfort setpoint cooling}} - T_{\text{Comfort setpoint heating}} = T_{\text{Dead zone}}$
$\rightarrow T_{\text{Comfort setpoint cooling}} \geq T_{\text{Comfort setpoint heating}}$

12.5.3 Basic setpoint adjustment via stages

In addition to specifying the basic set temperature with the ETS or with the basic setpoint object, it is possible for the user to adjust the basic setpoint value. The basic setpoint value is adjusted upwards or downwards in stages. The value of a stage is 0.5 K, 1 K, 1.5 K or 2 K.

ⓘ Please note that adjusting the set temperature has a direct effect on the basic setpoint value (temperature offset of the basic temperature) and thus all other temperature setpoints are adjusted! A positive adjustment is possible up to the configured max. set temperature setting. A negative adjustment can be made up to the min. set temperature setting.

ⓘ The "Basic setpoint value" object is not bidirectional, so that an adjusted basic setpoint value is not reported back to the KNX.

Whether a basic setpoint value adjustment only affects the currently activated operating mode or whether it has an effect on all other set temperatures of the other operating modes is specified by the parameter "Apply change of basic setpoint value adjustment permanently" on the parameter page "Room temperature control → Setpoint values".

"No" setting:
The adjustment made to the basic setpoint value is only effective as long as the operating mode is not changed or the basic setpoint value is maintained. Otherwise, the setpoint value adjustment is reset to "0".

"Yes" setting:
Adjusting the basic setpoint value generally affects all operating modes. Even after switching the operating mode or adjusting the basic setpoint value, the adjustment remains unchanged.

ⓘ Since the value for the basic setpoint adjustment is stored exclusively in a volatile memory (RAM), the adjustment is lost in the event of a reset (e.g. bus voltage failure).

ⓘ A setpoint adjustment does not affect the temperature setpoints for frost or heat protection.
Communication objects for basic setpoint adjustment:

The setpoint adjustment of the controller can be set externally with a 1-byte count value (according to KNX DPT 6.010 – Representation of positive and negative values in two's complement) via the "Specified setpoint adjustment" communication object. By linking to the object "Specified setpoint adjustment", controller extensions are able to directly set the current setpoint adjustment of the controller. As soon as the controller receives a value, it adjusts the setpoint adjustment according to the value. Values that are within the possible value range of the set temperature setting can be jumped to directly.
The controller monitors the received value independently. As soon as the external specified value exceeds the specified setpoint limits in positive or negative direction, the controller corrects the received value and sets the setpoint to the minimum or maximum specified setpoint. In this case, the value feedback is also set to the corresponding value via communication object "Current setpoint adjustment" depending on the direction of adjustment.

The current setpoint adjustment is monitored by the controller in the communication object "Current setpoint adjustment". This object has the same data point type and value range as the "Default setpoint adjustment" object. By connecting to this object, controller extensions are also able to display the current setpoint adjustment. As soon as an adjustment by one temperature stage is set in the positive direction, the value is increased by the controller. If the temperature stage is adjusted negatively, the count value is decreased. A value of "0" means that no setpoint adjustment has been set.

Example:
Initial situation:
Current basic set temperature = 21.0 °C / increment of setpoint adjustment = 0.5 K / count value in "Current setpoint adjustment" object = "0" (no setpoint adjustment active)
After adjusting the setpoint value:
- A setpoint adjustment by one temperature stage in positive direction increases the basic set temperature up to 21.5 °C. An adjustment with value 1 is reported via the "Current setpoint adjustment" object.
- A further setpoint adjustment by one temperature stage in the positive direction increases the basic set temperature to 22 °C. An adjustment with value 2 is reported via the "Current setpoint adjustment" object.
- A setpoint adjustment by one temperature stage in negative direction reduces the basic set temperature to 20.5 °C. An adjustment with value -1 is reported via the "Current setpoint adjustment" object.
- A further setpoint adjustment by one temperature stage in negative direction reduces the basic set temperature to 20 °C. An adjustment with value -2 is reported via the "Current setpoint adjustment" object.

ⓘ To ensure that controller extensions display correct adjustments and also correctly actuate the controller (as the main unit), it is necessary that the controller extensions work with the same increments for setpoint adjustment as the controller (0.5 K).

12.5.4 Basic setpoint adjustment via offset

In addition to specifying the basic set temperature with the ETS or with the basic setpoint object, it is possible for the user to adjust the basic setpoint value. The basic setpoint value is adjusted upwards or downwards according to the absolute setpoint adjustment received.

ⓘ Please note that adjusting the set temperature has a direct effect on the basic setpoint value (temperature offset of the basic temperature) and thus all other temperature setpoints are adjusted! A positive adjustment is possible up to the configured max. set temperature setting. A negative adjustment can be made up to the min. set temperature setting.

ⓘ The "Basic setpoint value" object is not bidirectional, so that an adjusted basic setpoint value is not reported back to the KNX.

Whether a basic setpoint value adjustment only affects the currently activated operating mode or whether it has an effect on all other set temperatures of the other operating modes is specified by the parameter "Apply change of basic setpoint value adjustment permanently" on the parameter page "Room temperature control → Setpoint values".

"No" setting:
The adjustment made to the basic setpoint value is only effective as long as the operating mode is not changed or the basic setpoint value is maintained. Otherwise, the setpoint value adjustment is reset to "0".

"Yes" setting:
Adjusting the basic setpoint value generally affects all operating modes. Even after switching the operating mode or adjusting the basic setpoint value, the adjustment remains unchanged.

ⓘ Since the value for the basic setpoint adjustment is stored exclusively in a volatile memory (RAM), the adjustment is lost in the event of a reset (e.g. bus voltage failure).

ⓘ A setpoint adjustment does not affect the temperature setpoints for frost or heat protection.

Communication objects for basic setpoint adjustment:
The setpoint adjustment of the controller can be set externally with a 2-byte floating point value (according to KNX DPT 9.002 – Temperature difference) via the "Specified setpoint adjustment" communication object. By linking to the object "Specified setpoint adjustment", controller extensions are able to directly set the current setpoint adjustment of the controller. As soon as the controller receives a value, it adjusts the setpoint adjustment according to the value. Values that are within the possible value range of the set temperature setting can be jumped to directly.
The controller monitors the received value independently. As soon as the external specified value exceeds the specified setpoint limits in positive or negative direction, the controller corrects the received value and sets the setpoint to the minimum or maximum specified setpoint. In this case, the value feedback is also set to the corresponding value via communication object "Current setpoint adjustment" depending on the direction of adjustment.

The current setpoint adjustment is monitored by the controller in the communication object "Current setpoint adjustment". This object has the same data point type and value range as the "Default setpoint adjustment" object. By connecting to this object, controller extensions are also able to display the current setpoint adjustment. As soon as an adjustment by an offset is set in positive direction, the controller adjusts the setpoint in positive direction. With a negative offset, the setpoint value is adjusted in the negative direction. A value of "0" means that no setpoint adjustment has been set.

Example:
Initial situation: Current basic set temperature = 21.0 °C / offset in "Current setpoint adjustment" object = "0" (no setpoint adjustment active)
After adjusting the setpoint value:

- A setpoint adjustment by a positive offset of 0.5 K increases the basic set temperature to 21.5 °C. An adjustment of 0.5 K is reported via the "Current setpoint adjustment" object.
- A further setpoint adjustment by a positive offset of 1 K increases the basic set temperature to 22 °C. An adjustment of 1 K is reported via the "Current setpoint adjustment" object.
- A setpoint adjustment by a negative offset of −0.5 K reduces the basic set temperature to 20.5 °C. An adjustment of -0.5 K is reported via the "Current setpoint adjustment" object.
- A further setpoint adjustment by a positive offset of -1 K reduces the basic set temperature to 20 °C. An adjustment of -1 K is reported via the "Current setpoint adjustment" object.

12.5.5 Transmitting the set temperature

The set temperature can be transmitted to the bus via the 2-byte object "Set temperature". The "Transmission on set temperature change by..." parameter in the "Room temperature control → Setpoint values" parameter node defines the temperature value by which the setpoint value must change until the set temperature value is automatically transmitted via the object. Temperature value changes between 0.1 K and 30 K are possible. The setting "0" at this point deactivates the automatic transmission of the set temperature.

In addition, the set value can be sent out cyclically. The "Cyclical transmission of set temperature" parameter sets the cycle time (1 to 255 minutes). The value "0" deactivates the cyclical transmission of the set temperature value. Please note that if cyclical transmission is deactivated and automatic transmission is switched off, no more telegrams are transmitted for the set temperature in the event of a change! By setting the "Read" flag on the "Set temperature" object, it is possible to read out the current setpoint value. After bus voltage return or after reprogramming by the ETS, the object value is initialised according to the set actual temperature value and actively transmitted to the bus.

12.6 Control value and status output

Depending on the control algorithm selected for heating and / or cooling mode, the format of the control value objects is defined. In this way, 1-bit or 1-byte control value objects are created in the ETS. The control algorithm calculates the control values at a time interval of 30 seconds and outputs them via the objects. With pulse width-modulated PI control (PWM), updating of the control value, if required, takes place exclusively at the end of a PWM cycle.

Possible object data formats for the control values separately for both operating modes:
- Continuous PI control: 1 byte
- Switching PI control: 1 bit + additional 1 byte (e.g. for status display for visualisation)
- Switching 2-point control: 1 bit

Depending on the set operating mode, the controller is able to control heating and / or cooling systems and determine control values and output them via separate objects. Heating and cooling systems are two separate systems. This means that separate objects are available for each control value, through which the individual systems can be controlled separately from each other. It is possible to define separate control modes for heating or for cooling.

If required, the control value can be inverted before output. The "Output of the control value heating" or "Output of the control value cooling" parameters output the control value inverted according to the object data format.

The following applies:

for continuous control values:
- not inverted: Control value 0 % ... 100 %, value 0 ... 255
- inverted: Control value 0 % ... 100 %, value 255 ... 0

for switching control values:
- not inverted: Control value off / on, value 0 / 1
- inverted: Control value off / on, value 1 / 0

12.6.1 Automatic transmission

When transmitting the control value telegrams automatically, the control mode is differentiated:

Continuous PI control:
With continuous PI control, the room thermostat cyclically calculates a new control value and outputs it to the bus via a 1-byte value object. In this process, the "Automatic transmission on change by..." parameter in the "Room temperature control → Control value and status output" parameter node can be used to define the change interval of the control value in percent, depending on which a new control value is to be output to the bus. The change interval can be parameterised to "0" so that no automatic transmission takes place when the control value changes.

In addition to the control value output in the event of a change, the current control value can be transmitted cyclically to the bus. In addition to the expected change times, further control value telegrams are output according to the active value after a parameterisable cycle time. This ensures that telegrams are received within the monitoring time in the event of cyclical safety monitoring of the control value in the valve drive or in the controlled switch actuator. The time interval defined by the "Cycle time for automatic transmission..." should correspond to the monitoring time in the actuator (preferably parameterise the cycle time in the controller to be smaller). The setting "0" deactivates the cyclical transmission of the control value.
With continuous PI control, it should be noted that no control variable telegrams are transmitted when cyclical transmission is deactivated and automatic transmission is switched off in the event of a change!

Switching PI control (PWM): With switching PI control (PWM), the room thermostat also cyclically calculates a new control value internally. However, updating of the switching control value with this control is only carried out at the end of the PWM time cycle, if necessary. The "Cycle time of the switching control value..." parameter defines the cycle time of the PWM control value signal.

2-point control:
With a 2-point control, the evaluation of the room temperature and the hysteresis values takes place cyclically, and the control value changes immediately if necessary. Since this control algorithm does not calculate continuous control values, the "Automatic transmission on change by..." parameter is not effective for this control algorithm. In addition to the control value output in the event of a change, the current control value can be transmitted cyclically to the bus. In addition to the expected change times, further control value telegrams are output according to the active value after a parameterisable cycle time. This ensures that telegrams are received within the monitoring time in the event of cyclical safety monitoring of the control value in the valve drive or in the controlled switch actuator. The time interval defined by the "Cycle time for automatic transmission..." should correspond to the monitoring time in the actuator (preferably parameterise the cycle time in the controller to be smaller). The setting "0" deactivates the cyclical transmission of the control value.

12.6.2 Controller status

The room thermostat is able to transmit its current status to the KNX / EIB.

The KNX-compliant controller status feedback is harmonised regardless of the manufacturer and consists of 2 communication objects. The 2-byte object "KNX Status" (DPT 22.101) displays elementary basic functions of the controller (see table). This object is supplemented by the 1-byte object "Currently active operating mode" (DPT 20.102), which reports the operating mode currently set for the controller. The latter object is usually used to enable controller extensions to correctly display the controller operating mode in the KNX-compliant status indicator.

Consequently, these objects are to be connected to controller extensions.

Bit coding of the 2-byte "KNX status" telegram:

Bit of the status telegram	Meaning
0	Controller error status ("0" = no error / "1" = error)
1	not used (permanent "0")
2	not used (permanent "0")
3	not used (permanent "0")
4	not used (permanent "0")
5	not used (permanent "0")
6	not used (permanent "0")
7	not used (permanent "0")
8	Operating mode ("0" = cooling / "1" = heating)
9	not used (permanent "0")
10	not used (permanent "0")
11	not used (permanent "0")
12	Controller disabled (dew point operation) ("0" = controller enabled / "1" = controller disabled)
13	Frost alarm ("0" = frost protection temperature exceeded / "1" = frost protection temperature not reached)
14	Heat alarm ("0" = heat protection temperature not reached / "1" = heat protection temperature exceeded)
15	not used (permanent "0")

The general controller status compiles essential status information of the controller in two 1-byte communication objects. The "Controller status" object contains basic status information (see table). The "Status message additional" object collects further information on a bit-oriented basis that is not available via the "Controller status" object (see table). For example, controller extensions evaluate the additional status information in order to be able to display all required controller status information on the extension display.

Bit coding of the 1-byte "Controller status" telegram:

Bit of the status telegram	Meaning
0	for "1": Comfort operation active
1	for "1": Standby operation active
2	for "1": Night operation active
3	for "1": Frost/heat protection operation active
4	for "1": Controller disabled
5	for "1": Heating, for "0": Cooling
6	for "1": Controller inactive (dead zone)
7	for "1": Frost alarm (TRoom ≤ +5 °C)

Bit coding of the 1-byte "Status message additional" telegram:

Bit of the status telegram	Meaning for "1"	Meaning for "0"
0	Normal operating mode	Forced operating mode
1	: Comfort extension active	No comfort extension
2	Presence (presence detector)	No presence (presence detector)
3	Presence (presence button)	No presence (presence button)
4	Window open	No window open
5	Additional stage active	Additional stage not active
6	Heat protection active	Heat protection not active
7	Controller disabled (dew point operation)	Controller not disabled

Meaning of the status messages:

"Comfort operation active" → Active if the "Comfort" operating mode or a "Comfort extension" is activated.

"Standby operation active" → Active when the "Standby" operating mode is activated.

"Night operation active" → Active when the "Night" operating mode is activated.

"Frost / heat protection active" → Active when the "Frost / heat protection" operating mode is activated.

"Controller disabled" → Active when controller disabling is activated (dew point operation).

"Heating / cooling" → Active when heating mode is activated and inactive when cooling mode is activated. Inactive in the event of controller disabling.

"Controller inactive" → Active with the following parameter settings: "Operating mode = heating and cooling" and "Switching between heating and cooling = automatic", if the determined room temperature is within the dead zone. In the individual operating modes "Heating" or "Cooling", this status information is always "0". In the "Heating and cooling" operating mode, the status information is also "0" if the switching between heating and cooling takes place via an object. Inactive in the event of controller disabling.

"Frost alarm" → Active when the detected room temperature reaches or falls below +5 °C. This status message has no particular influence on the control behaviour.

ⓘ The status objects are updated after a reset following the initialisation phase. Telegrams are then only transmitted to the bus if the status changes.

12.7 Fan control

12.7.1 Introduction

The room temperature control can be supplemented with a fan control. In this way, it is possible to control the fan of air circulating heating or cooling systems, such as fan coil units, depending on the control value calculated in the controller and also by manual operation. If required, the fan control can be enabled separately by the "Activate fan control" parameter in the "Room temperature control" parameter node. If the function is enabled, further parameters in the "Room temperature control → Fan control" parameter node and additional communication objects appear in the ETS.

If fan control is enabled, the detail page for fan control is enabled after commissioning the device. The fan control can be operated on the touch display via the second detail page of the controller.

ⓘ The fan control works exclusively in conjunction with PI controllers with continuous or switching (PWM) control value output. In a 2-point control, the fan control is inactive, even if the function is enabled in the ETS!

Fan coil units usually have multistage fans that can be varied in speed and thus in ventilation output via fan stage inputs. For this reason, the fan control of the room thermostat supports up to 3 fan stage outputs; the actually used number of stages (1 to 3) can be set by the "Number of fan stages" parameter. The controller controls the fan stages via bus telegrams. As a rule, the fan stage telegrams are received and evaluated by simple switch actuators. These actuators are then used to electrically control the fan stage inputs of a fan coil unit. Depending on the data format of the objects of the controlled actuators, the fan stages can be switched either via up to 3 separate 1-bit objects or alternatively via one 1-byte object. The "Fan stage switching via" parameter defines the data format of the objects for outputting the fan stage. With the 1-bit objects, each fan stage discretely receives its own object. With the 1-byte object, the active fan stage is expressed by a value.

Value meaning for 1-byte fan stage object:

Fan stage	Object value
Fan OFF	0
1	1
2	2
3	3

Due to the inertia of a fan motor, it is usually not possible to switch the fan stages at any short time intervals, i.e. the fan speed cannot vary at any speed. Often, the technical information for a fan coil unit specifies switching times that the fan control must comply with each time the fan stage is switched. The switching direction, i.e. increasing or decreasing the stage, is irrelevant.
When switching via the 1-bit objects, the active fan stage is first switched off by the controller when changing the fan stage before the new stage is switched on. If the fan control works in automatic operation, the adjustable "Waiting time for stage switching" is observed when switching stages. The fan stage objects all receive the status "0 – Fan Off" for this short duration. A new stage is only switched on when the waiting time has elapsed. Only one fan stage output is always switched on (alternating principle).
When switching via the 1-byte object, the fan stage is switched directly to the new stage when changing the fan stage without setting the "OFF" status. If the fan control works in automatic operation, the adjustable "Waiting time for stage switching" (dwell time) is always taken into account before switching the stages. In the case of fast stage switching, switching to a new stage only takes place when the waiting time has elapsed.

ⓘ The switching from OFF to stage 1 always takes place without delay and without a waiting time. An optionally parameterised start-up stage is jumped to directly.

ⓘ In manual operation, the "Waiting time for stage switching" is only relevant for the switch-on stage (start-up via stage). Here, the fan stages can be switched without delay in manual operation.

ⓘ When changing from manual operation to automatic operation, the waiting time is taken into account in case of associated stage switching!

ⓘ The fans of a fan coil unit are controlled – as described above – by the fan stage objects of the controller. The electromechanical valves for heating and / or cooling integrated in the fan units can be controlled via suitable switch actuators by the objects "Message heating" or "Message cooling".

ⓘ If required, the 1-byte object "Fan stage feedback" can also be evaluated by other bus devices (e.g. visualisation – Tableau / PC software). It always returns the current fan stage as a 1-byte value, either automatically when it is changed or passively when it is read out.

ⓘ After a device reset, the fan stage objects and the visualisation object are updated and the status is transmitted to the bus.

12.7.2 Automatic operation / manual operation

The fan control distinguishes between automatic and manual operation. Switching between the two operating modes is done via the 1-bit object "Setting ventilation auto / manual", or via the 2nd detail page of the controller.

The parameter "Interpreting object fan control automatic / manual" in the parameter group of the fan control defines which switching value is used to set automatic or manual operation via the communication object.

Automatic operation:
The control value of the controller is used internally in the device for automatic control of the fan stages. For the transition between the stages, threshold values are defined in relation to the control value of the controller, which can be set via parameters in the ETS. If the control value reaches the threshold value of a stage during an increase of the control value, the respective stage is activated. If the control value reaches the threshold value minus the configured hysteresis during a reduction of the control value, switching to the next lower fan stage takes place. The hysteresis value is valid for all threshold values. The threshold values for the individual fan stages can be freely parameterised in the range from 1 ... 100 %. In the ETS, the threshold values are not checked for plausibility, which means that incorrect parameterisation is possible. For this reason, it must be ensured that the threshold values are parameterised in ascending order compared to the stage value (threshold value stage 1 < threshold value stage 2 < threshold value stage 3). When changing the control value and thus the fan stage, it is only possible to switch directly to adjacent stages (exception: switch-on stage). In automatic operation, for example, it is only possible to switch from fan stage 2 down to stage 1 or up to stage 3. If a change in the control value exceeds or falls below the threshold values of several fan stages, all fan stages are activated one after the other, starting from the current fan stage, until the fan stage specified by the control value is reached. When the fan is switched off by automatic operation, it continues to run for the parameterised "Fan run-on time heating" or "Fan run-on time cooling", provided that these run-on times have been parameterised in the ETS.

ⓘ The fan stage objects are updated in automatic operation depending on the internal control value calculation plus the parameterised waiting time for stage switching. A telegram is only transmitted when the object values of the fan stages are changed. After a device reset, the fan stage objects are updated and the status is transmitted to the bus.

ⓘ The timer of the waiting time starts the moment a threshold value is exceeded or undershot. Only after the waiting time has elapsed does the device automatically switch the fan stage.

ⓘ If a switch-on stage is configured in the ETS ("Start-up via stage" parameter), it is possible to switch briefly to a higher stage defined in the ETS before automatically activating a fan stage according to the control value (see section "Switch-on stage").

Manual operation:
When operating via the slider on the 2nd detail page of the controller, the controller distinguishes whether it is in automatic or manual mode at the time of operation.
If the controller is in automatic operation, the device does not accept any changes and retains the automatically defined fan stage.

By pressing the "Auto / Man" field at the bottom of the detail page, you can switch between automatic and manual mode. In addition to operation, the current mode is also displayed here. If "Auto" appears in the display, the fan control is in automatic mode. If "Man" appears in the display, the fan control is in manual mode.

Only when the fan control has been switched to manual operation ("Auto" in the lower part of the display) can the fan stage be adjusted using the slider or the "+" and "-" icons.

The fan stage is maintained when switching to manual operation. If manual control is already active when the button is pressed, the control switches to the next higher or next lower fan stage. If the fan is at the highest stage, any further actuation of the + icon has no effect. If the fan is switched off manually from the highest stage, it continues to run for the parameterised "Fan run-on time heating" or "Fan run-on time cooling", provided that run-on times have been parameterised in the ETS. If the button for manual control is pressed again within a run-on time, the control aborts the run-on time. The fan switches off briefly and then immediately switches to stage 1.

12.7.3 Switch-on stage

The fan can be temporarily switched to a defined switch-on stage if it was previously switched off and is to be started. This switch-on stage can be any of the existing fan stages and is set in the ETS by the parameter "Start-up via stage". The switch-on stage is usually one of the higher fan stages of a fan coil unit, so that the fan starts up optimally at the beginning of a heating or cooling operation (safe start-up of the fan motor by implementing a higher torque, thus higher fan speed).

The switch-on stage remains active for the "Waiting time for stage switching" configured in the ETS. In automatic operation, the control only switches to the fan stage specified by the control value when the waiting time has elapsed. Switching does not take place if, after the waiting time has elapsed, the fan stage specified by the control value corresponds to the switch-on stage.

ⓘ If the controlled fan requires a longer time for start-up, the waiting time in the ETS should be configured to larger values (possible time range 100 ms ... 25.5 s). Please note that the waiting time is also taken into account for each stage switching in automatic operation!

The switch-on stage is always taken into account by the fan control in automatic operation when the fan is switched on (if it was previously switched off by the control value evaluation) and also after activation of manual operation.

ⓘ A parameterised switch-on stage is activated directly without a waiting time.

ⓘ When switching the fan stage via the 1-bit objects, the active fan stage is first switched off by the controller when changing the fan stage before the new stage is switched on. In this case, switching off a fan stage and then switching to a new fan stage is not considered a fan start-up, which is why the switch-on stage is not set. The switch-on stage is only taken into account in automatic operation if the fan was previously switched off by the control value evaluation (control value < threshold value stage 1 minus hysteresis) and is then to be started up by a new control value.

ⓘ The start-up via the switch-on stage also takes place after switching from manual to automatic operation, provided the fan was last switched off in manual operation and a new control value requires the fan to be switched on in automatic operation.

ⓘ The "Start-up via stage" parameter is not checked for plausibility in the ETS, which means that incorrect parameterisation is possible. For this reason, it must be ensured that no higher switch-on stage is parameterised than the fan stages that are actually available. The fan control automatically corrects an incorrect parameterisation by activating stage 1 for the start-up so that the fan starts up normally without a switch-on stage.

12.7.4 Fan stage limitation

To reduce the fan noise of a fan coil unit, the fan stage limitation can be activated. The stage limitation reduces the noise emission by limiting the maximum fan stage to a fan stage value (max. fan stage) specified in the ETS by the "Stage limitation" parameter. The limitation can be switched on and off via the 1-bit object "Ventilation, stage limitation" and thus activated based on demand, e.g. by a timer switch during night hours for noise reduction in bedrooms or by "manual" operation of a push-button sensor when using a "quiet room" (lecture hall or the like). The limitation of the fan stage is activated by receiving a "1" telegram via the "Ventilation, stage limitation" object. Consequently, deactivation takes place by receiving a "0" telegram. During an active limitation, the fan control prevents the fan from being switched to a higher stage than the limitation stage. If the fan is running at a higher stage than the limitation stage at the time the limitation is activated, the fan stage is reduced to the limitation value. In this case, the switching sequence of the individual stages and the waiting time configured in the ETS are also taken into account during stage switching. The limiting stage can be one of the existing fan stages. The stage limitation affects automatic operation and also manual operation.

ⓘ The fan stage limitation overrides the switch-on stage. Consequently, when the fan is switched on, the stage is actively limited and the switch-on stage is not approached if the limitation is active. In this case, the limiting stage is jumped to directly without a waiting time.

ⓘ The stage limitation is not effective with an activated forced fan position.

ⓘ The "Stage limitation" parameter is not checked for plausibility, which means that incorrect parameterisation is possible. For this reason, it must be ensured that no higher limitation stage is parameterised than the fan stages that are actually available. If a higher limitation stage is parameterised, the limitation is ineffective.

12.7.5 Fan forced position

The controller offers the option of activating a forced fan position via the bus. When the forced position is active, the fan stages cannot be controlled or switched in automatic or manual operation. The fan remains in the forced state until the forced state is deactivated via the bus. This allows the fan to be brought into a blocked and controlled state for service purposes, for example. As soon as a "1" telegram is received via the 1-bit object "Ventilation, forced position", the control jumps to the fan stage parameterised in the ETS without a waiting time. The fan can also be switched off completely. The only special case when activating the forced position is when the fan control is in automatic operation and a waiting time has elapsed due to previous stage switching. In this case, the fan control only switches to the forced position stage after the waiting time has elapsed.
The forced position is prevailing. For this reason, it cannot be overridden by automatic operation, manual operation, stage limitation or fan protection. Only after the forced position has been deactivated does the fan control resume control of the fan stages depending on the active operating mode. Deactivation takes place by receiving a "0" telegram via the "Ventilation, forced position" object. The fan is then always switched off. In automatic operation, the control then evaluates the active control value and switches to the required fan stage after the waiting time set in the ETS has elapsed, taking into account an optionally parameterised switch-on stage. In manual operation, the fan initially remains switched off. The fan stage is only increased when the manual control button is pressed again. If a switch-on stage is configured, the control switches to the switch-on stage when a button is pressed and remains there until another operation is performed.

ⓘ The "Behaviour at forced position" parameter is not checked for plausibility, which means that incorrect parameterisation is possible. For this reason, it must be ensured that no higher fan stage is parameterised than the fan stages that are actually available. If a higher stage is parameterised for the behaviour in forced position than for the number of fan stages, the fan control switches to the maximum possible stage when the forced position is activated.

ⓘ The forced fan position does not influence the control algorithm integrated in the controller. The control values of the PI control are still transmitted to the bus even with a forced fan.

12.7.6 Fan protection

With the fan protection function, the fan of a fan coil unit that has not been in operation for a longer period of time can be temporarily switched to the maximum stage. In this way, the controlled fan motors can be protected against becoming stuck. In addition, dust formation on the fan blades and the heat exchanger of the fan coil unit is prevented. If the fan protection is to be used, it must be enabled in the ETS by the parameter with the same name. The fan protection can then be activated or deactivated directly by the 1-bit communication object "Ventilation, fan protection", by a KNX / EIB timer switch, for example. If the fan protection object has the switching value "1", the fan protection function is active. The fan then operates at the highest possible fan stage and overrides automatic and manual operation. The fan protection can then be switched off again with the switching value "0" in the communication object.
The reaction of the fan when the fan protection is switched off depends on the operating mode of the automatic fan control. In automatic mode, the fan switches to the stage that is determined by the control value of the room temperature control. In manual operation, the fan switches off and can then be switched on again by further manual operation. The "Start-up via stage" parameter is taken into account at this point.

ⓘ Even if the fan control is not active due to the controller operating mode, the fan can be activated by the fan protection.

ⓘ If stage limitation is active, the maximum fan stage of the fan protection is specified by the limitation stage.

ⓘ When the forced position is active, the fan protection is not executed for safety reasons.

ⓘ If fan run-on times are configured in the ETS, the fan is switched off with a delay when the fan protection is deactivated.

12.7.7 Flow chart

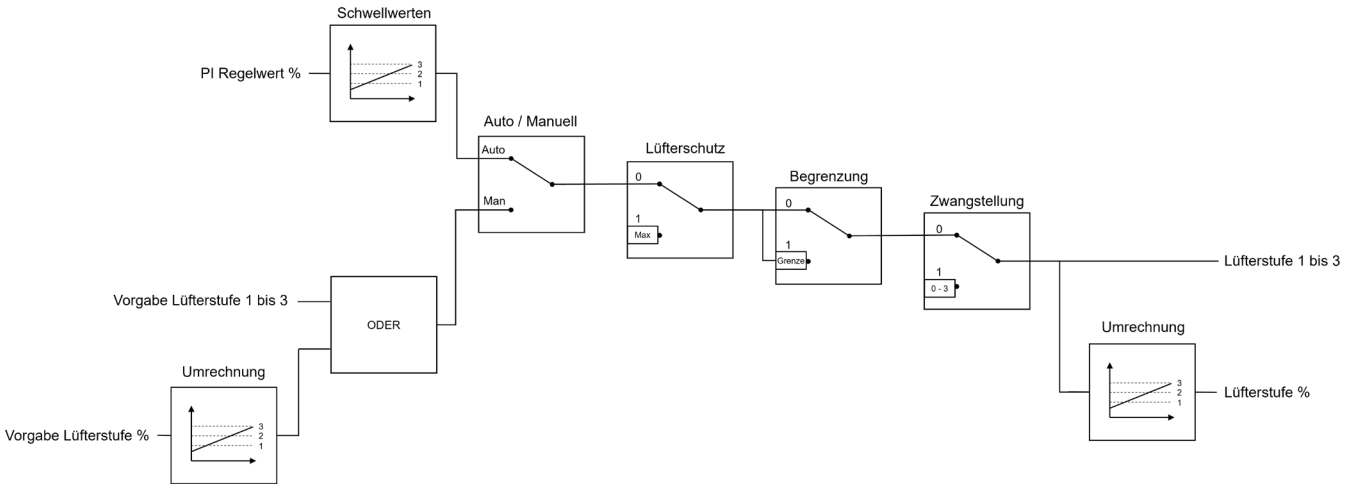


Fig. 131: Fan control flow chart

12.8 Disabling functions of the room thermostat

In certain operating states, it may be necessary to deactivate the room temperature control. For example, the control can be switched off during dew point operation of a cooling system or during maintenance work on the heating or cooling system. The "Switch off controller (dew point operation)" parameter in the "Room temperature control → Controller functionality" parameter node enables the 1-bit "Disable controller" object with the "Via object" setting. Furthermore, the controller disabling function can be switched off with the setting "No".
If a "1" telegram is received via the enabled disabling object, the room temperature control is completely deactivated. In this case, all control variables = "0". However, operation of the controller is still possible.

ⓘ The controller has no function during dew point operation. The building functions to be controlled are in a critical state, which should be monitored by the building system.

ⓘ Disabling operation is always deleted after a reset (bus voltage return, ETS programming operation)!

12.9 Operation

12.9.1 Favourites page 1-gang, 2-gang or 3-gang display (top or right)

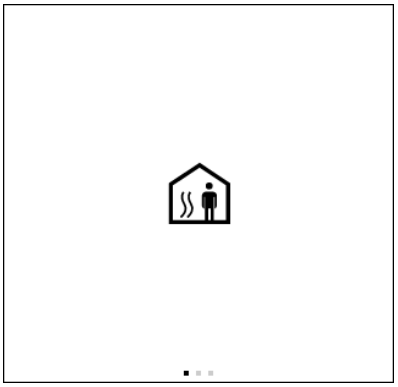


Fig. 132: Controller operation favourites, 1-gang

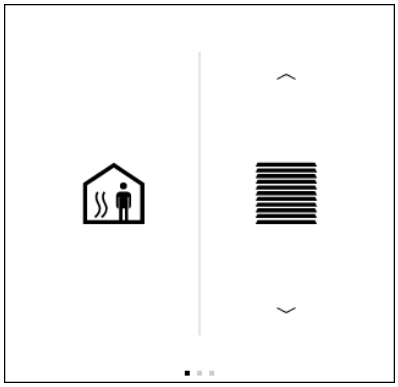


Fig. 133: Controller operation favourites, 2-gang

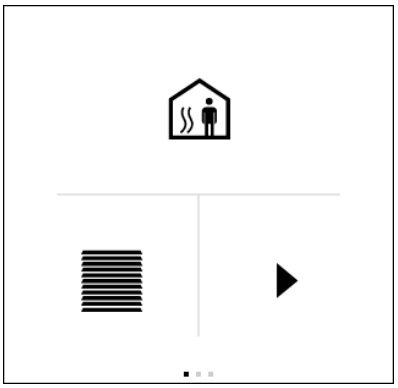


Fig. 134: Controller operation Favourites, 3-gang top

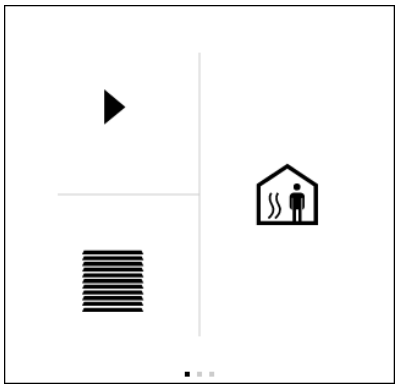


Fig. 135: Controller operation Favourites, 3-gang right

Tap the centre of the control element (icon):
Switching operating mode

Press and hold the centre of the control element (value):
Detail page is shown

12.9.2 Favourites page 3-gang (top or bottom left) or 4-gang display

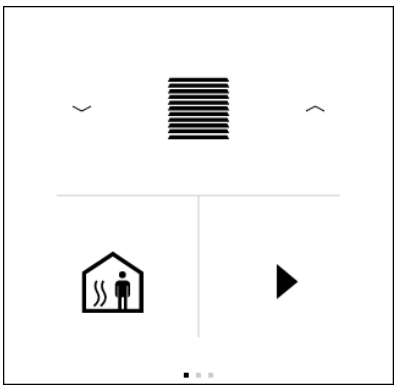


Fig. 136: Controller operation
Favourites, 3-gang bottom left

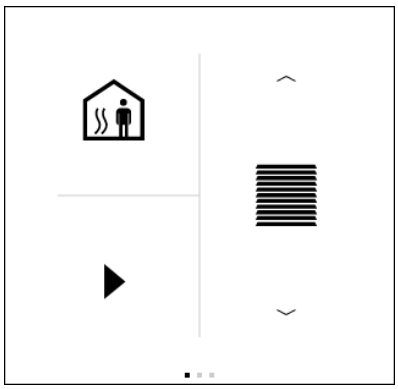


Fig. 137: Controller operation
Favourites, 3-gang top left

Fig. 138: Controller operation favourites, 4-gang

Tap the centre of the control element (icon):
Send configured scene number via the "Scene extension" object

Press and hold the centre of the control element (value):
Detail page is shown

12.9.3 Switching operating mode

On the detail page for the controllers, the operating mode can be changed using the "Operating mode" icon.

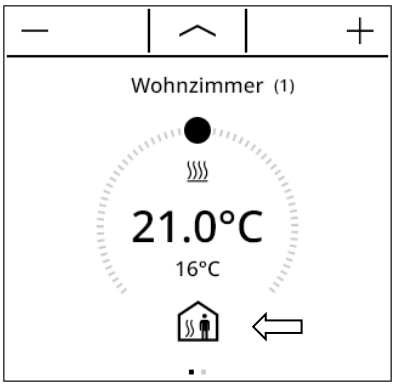


Fig. 139: Changing the controller operating mode

The control element enables users to choose from the following modes:
- Comfort mode
- Standby mode
- Night mode
- Frost / heat protection mode

The frost protection icon can be shown or hidden in the controller parameters:

Fig. 140: Controller, show or hide frost protection icon

- Activated: Actuating the operating mode icon switches between Comfort → Standby → Night → Frost/heat protection
- Deactivated: Actuating the operating mode icon switches between Comfort → Standby → Night

12.9.4 Setpoint adjustment

Setpoint adjustment is available as a further function of the controllers.
Using the slider or the "+" and "-" buttons, the temperature basic setpoint value can be set on a room thermostat.

– Each actuation of "-" or "+" decreases or increases the setpoint adjustment value in the predefined increment.

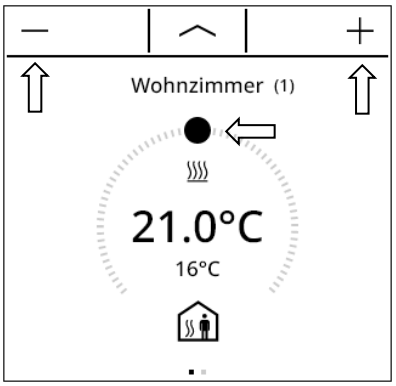


Fig. 141: Setting the setpoint value controller

12.9.5 Fan control

The fan control can be influenced on the second detail page of the controllers.

The Auto / Man button at the bottom of the display is used for switching between automatic and manual fan control.

If the fan control is set to manual, the desired fan stage can be selected using the slider or the "+" and "-" buttons.

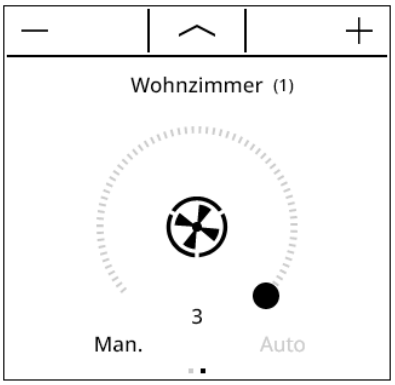


Fig. 142: Controller, setting the fan stage

12.10 Display functions

12.10.1 Display of the controller operating mode

In the display, the controller shows the current operating mode via the Comfort, Standby, Night and Frost/heat protection symbols.

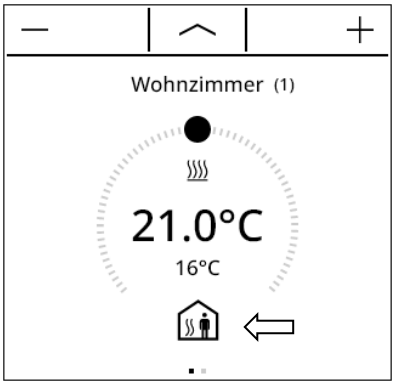


Fig. 143: Controller operating mode display

It is not possible to distinguish on the display whether the operating mode was set by a forced object or by "normal" operating mode switching.

12.10.2 Display of the set and actual temperature

The controller shows the set temperature in large format on the display. If the "Slider" control element is activated in the parameter of the controller extension, the slider also displays the set temperature.

The actual temperature of the controller is displayed in small format as shown below.

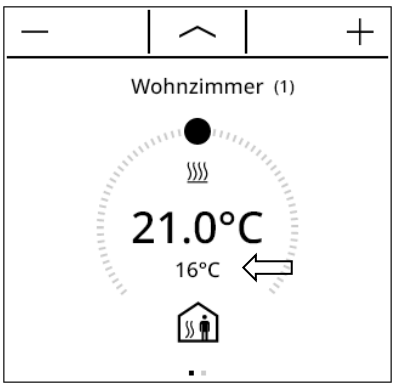


Fig. 144: Controller, display of actual temperature in small format

12.10.3 Display of control values for heating and cooling

In the display for the heating or cooling system, the controller shows whether heating or cooling energy is currently being requested. The information is shown using the symbols for heating or cooling.

Fig. 145: Controller, heating and cooling symbols

12.10.4 Display of fan stages

On the 2nd detail page in the display, the current fan stage for a fan control is shown.

Fig. 146: Controller, fan stage symbols

12.11 parameter

12.11.1 General

Inscription	free text with max. 28 characters Default: empty
The text is displayed as the heading of the room thermostat page. In addition, the text entered in this parameter is used to identify the room thermostat page in the ETS parameter window and is carried over into the name of the objects.	

Slider control	Active, inactive
If activated, a slider for entering the set temperatures is shown on the room thermostat page of the display. If the parameter is not active, then the set temperature can only be changed using the plus and minus push-buttons.	

Frost protection symbol control	Active, inactive
On the room thermostat page of the display, the current operating mode is shown below the actual temperature by means of the operating mode icon. You can switch between the operating modes by tapping this icon. If this parameter is active, then the frost protection mode can also be activated by means of switching. If the parameter is not active, then the frost protection mode cannot be selected on the device.	

Operating mode	Heating, Cooling, Heating and cooling
The room thermostat essentially distinguishes between two operating modes. The operating modes determine whether the controller should control heating systems ("Heating" individual operating mode) or cooling systems ("Cooling" individual operating mode) through its control value. It is also possible to activate mixed operation, where the controller can switch between "Heating" and "Cooling" either automatically or alternatively controlled via an object. The operating mode determines the set temperature currently applicable to the controller. The currently effective set temperature of the controller is displayed on the device. The set temperature is the sum of the basic setpoint value, standby / night adjustment (if this mode is active) + setpoint adjustment. Switching the operating mode therefore also changes the set temperature. In comfort mode, the set temperature can be adjusted up to the limits of the controller, but in the other modes, the comfort temperature limits the possible setpoint adjustment. This limitation is visualised on the device by the display "jumping" back.	

Type of heating control	Continuous PI control, Switching PI control (PWM), Switching 2-point control
This parameter selects the control algorithm for the heating system and influences the data type of the object for the control value.	

Type of heating	Hot water heating (5 K/150 min), underfloor heating system (5 K/240 min), electric heating (4 K/100 min), fan coil unit (4 K/90 min), split unit (4 K/90 min), via control parameters
Adjustment of the PI algorithm to different heating systems with predefined values for the control parameters "proportional range" and "reset time". With the setting "via control parameters" it is possible to set the control parameters deviating from the predefined values within specific limits. This parameter is only visible with "Type of heating control" = "Continuous PI control" or "Switching PI control".	

Heating proportional range	1 ... 5 ... 15
Separate setting of the control parameter "Proportional range". This parameter is only visible with "Type of heating" = "via control parameters".	

Heating reset time in minutes (0 = inactive)	0 ... 150 ... 255
Separate setting of the control parameter "reset time". The setting "0" deactivates the reset time. This parameter is only visible with "Type of heating" = "via control parameters".	

Lower hysteresis limit of the 2-point heating controller	-13 ... -0.5
Definition of the lower hysteresis (switch-on temperatures) of the heating. This parameter is only visible with "Type of heating control" = "Switching 2-point control".	

Upper hysteresis limit of the 2-point heating controller	0.5 ... 13
Definition of the upper hysteresis (switch-off temperatures) of the heating. This parameter is only visible with "Type of heating control" = "Switching 2-point control".	

Type of cooling control	Continuous PI control, Switching PI control (PWM), Switching 2-point control
This parameter selects the control algorithm for the cooling system and influences the data type of the object for the control value.	

Type of cooling	Cooling ceiling (5 K/240 min), fan coil unit (4 K/90 min), split unit (4 K/90 min), via control parameters
Adjustment of the PI algorithm to different cooling systems with predefined values for the control parameters "proportional range" and "reset time". With the setting "via control parameters" it is possible to set the control parameters deviating from the predefined values within specific limits. This parameter is only visible with "Type of cooling control" = "Continuous PI control" or "Switching PI control".	

Cooling proportional range	1 ... 5 ... 15
Separate setting of the control parameter "Proportional range". This parameter is only visible with "Type of cooling" = "via control parameters".	

Cooling reset time in minutes (0 = inactive)	0 ... 240 ... 255
Separate setting of the control parameter "reset time". The setting "0" deactivates the reset time. This parameter is only visible with "Type of heating" = "via control parameters".	

Lower hysteresis limit of the 2-point cooling controller	-13 ... -0.5
Definition of the lower hysteresis (switch-on temperatures) of the cooling. This parameter is only visible with "Type of heating control" = "Switching 2-point control".	

Upper hysteresis limit of the 2-point cooling controller	0.5 ... 13
Definition of the upper hysteresis (switch-off temperatures) of the cooling. This parameter is only visible with "Type of heating control" = "Switching 2-point control".	

Activating the fan control	Active, inactive
A fan control can be added to the controller extension by means of this parameter. This creates a second page for fan control on the device in addition to the detail page for setting the operating mode and the setpoint adjustment. By enabling the fan control, it is possible to control the fan of air circulating heating or cooling systems, such as fan coil units, depending on the control value calculated in the controller and also by manual operation. If the function is enabled, further parameters and additional objects appear in the ETS.	

Overwriting controller settings on the device during ETS programming operation	Active, inactive
If this parameter is active, then all settings for the controller made by the user on the device are overwritten during an ETS programming operation. This affects the following parameters: "Reducing the set temperature heating standby", "Reducing the set temperature heating night", "Increasing the set temperature cooling standby", "Increasing the set temperature cooling night". If this parameter is not active, the settings are not overwritten.	

Operating mode after reset	Restore operating mode before reset, comfort operation, standby operation, night operation, frost / heat protection operation
This parameter determines which operating mode is set immediately after a device reset.	

Frost / heat protection	Frost protection automatic mode, Via window status
In addition to operating mode switching by the corresponding operating mode switching object or by room thermostat operation on the device, frost / heat protection can be activated by a window contact or, alternatively, frost protection can be activated by an automatic temperature control. This parameter defines how the higher-priority switching is carried out compared to the operating mode switching by object or button function. In the "Frost protection automatic temperature reduction" mode, the "Temperature drop detection" object is enabled. In the "Via window contacts" mode, the window contacts object is enabled. If an open window is detected on this input, the controller immediately switches to frost / heat protection operating mode. If the window is closed again, the controller switches back to the last active mode.	

Automatic frost protection temperature reduction	Off, 0.2 K/min, 0.3 K/min, 0.4 K/min, 0.5 K/min, 0.6 K/min
The "Frost protection automatic temperature reduction" parameter sets the maximum temperature reduction for frost protection switching in K/min. Only visible with "Frost / heat protection" = "Frost protection automatic mode".	

Switching between heating and cooling	Automatic, via object (heating / cooling switching)
If the mixed operating mode is parameterised, it is possible to switch between heating and cooling. Automatic: Switching takes place automatically depending on the operating mode and the room temperature. The "Heating / cooling switching" object is an output in this mode. Via object (Heating / cooling switching): Switching takes place exclusively via the "Heating / cooling switching" object, which is an input in this mode.	

Cyclical transmission of heating / cooling switching (0 = inactive)	0 ... 255
This parameter determines whether the current object status of the "Heating / cooling switching" object is to be output cyclically on the bus in the case of automatic switching. The cycle time can be set at this point. The setting "0" deactivates the cyclical transmission of the object value. Only visible with "Switching between heating and cooling" = "automatic".	

Heating / cooling after reset operating mode	Heating, Cooling, operating mode before reset
The preset operating mode after bus voltage return or an ETS programming operation is set here. Only visible with "Switching between heating and cooling" = "via object".	

12.11.2 Setpoint values

Comfort operation setpoint value (basic set temperature)	7 ... 22 ... 40
This parameter defines the temperature value that is adopted as the basic setpoint value after commissioning by the ETS. All temperature setpoints are derived from the basic setpoint value. In the operating modes "Heating" and "Cooling", the parameter directly specifies the basic setpoint value. In the mixed operating mode "Heating and cooling", the following applies: "Comfort mode setpoint value" of cooling mode = "Comfort mode setpoint value" of heating mode + "Dead zone between heating and cooling".	

Apply changes to the basic setpoint adjustment permanently	Active, inactive
In addition to specifying individual temperature setpoints through the ETS or through the basic setpoint value object, it is possible for the user to move the basic setpoint value within a specific range using the display. This parameter specifies whether a basic setpoint adjustment only has a temporary effect on the currently activated operating mode or whether it has a permanent effect on all other set temperatures of the other operating modes. If set to "Yes", adjusting the basic setpoint value generally affects all operating modes. If set to "No", adjusting the basic setpoint value only has an effect as long as the operating mode is not changed. Otherwise, the setpoint value adjustment is reset to "0". The basic setpoint adjustment set on the device is reset to "0" by a device restart, bus voltage failure or an ETS programming operation.	

Changing the setpoint value of the basic temperature	Disabled, Allow via bus
This determines whether it is possible to change the basic setpoint value via the bus. If "Allow via bus" is parameterised, the "Basic setpoint value" object is enabled. This allows the basic setpoint value to be changed via an object. The value transmitted overwrites the basic set temperature parameterised in the ETS. The changed value is retained even after a device reset or bus voltage failure. The value is only overwritten again by the value parameterised in the ETS during an ETS programming operation.	

Dead zone between heating and cooling	0 ... 2 ... 15
If the mixed operating mode "Heating and cooling" is parameterised, a dead zone must be parameterised between heating and cooling. This sets the temperature difference between the comfort set temperature in heating mode and that in cooling mode.	

Type of setpoint adjustment	Via stages (DPT 6.010), Via offset (DPT 9.002)
The parameter specifies the data type for the communication objects of the room thermostat (controller main unit) with a controller extension. Depending on the setting of the "Type of setpoint adjustment" parameter, the adjustment is made via the 2-byte object "Specified setpoint adjustment (according to KNX DPT 9.002)" or via the 1-byte object "Specified setpoint adjustment (according to KNX DPT 6.010)". For a basic setpoint adjustment, a controller extension uses the two objects "Specified setpoint adjustment" and "Current setpoint adjustment". With the "Current setpoint adjustment" object, the room thermostat informs an extension of the current status of the room thermostat. This in turn can change the current setpoint temperature in the room thermostat via the "Setpoint adjustment" object. However, with the setting "Type of setpoint adjustment" "Specified setpoint adjustment (according to KNX DPT 6.010)", the setpoint adjustment received as a stage value is first converted into a temperature adjustment by means of the parameter "Value of setpoint adjustment". To ensure that the stage value is interpreted correctly at the controller main unit, the same value must be set at the controller extension as at the controller main unit.	

Increment of the 4-stage setpoint adjustment	0.5 K, 1.0 K, 1.5 K, 2.0 K
This parameter defines the value of a stage of the basic setpoint adjustment. It is possible to adjust the basic setpoint value by up to 4 stages. This parameter is only relevant if "Via stages" has been parameterised for "Type of setpoint adjustment". When using a controller extension, make sure that this setting of the controller extension corresponds to that of the controller main unit! The parameter also affects the adjustable value range for the temperature adjustment on the device. This means that only temperature values can be entered on the device that are between (- "value of set temperature" x 4) and (+ "value of set temperature" x 4) from the set temperature of the current operating mode.	

Reducing the set temperature heating standby	-10 ... -3 ... 0
The standby set temperature for heating is reduced by this value compared to the comfort temperature in the "Heating" operating mode. The parameter is only visible in the "Heating" or "Heating and cooling" operating mode. This reduction can also be changed by the user on the device. This then overwrites the value parameterised by the ETS and is retained even after a device restart or bus voltage failure.	

Reducing the set temperature heating night	-10 ... -4 ... 0
The night temperature for heating is reduced by this value compared to the comfort temperature in the "Heating" operating mode. The parameter is only visible in the "Heating" or "Heating and cooling" operating mode. This reduction can also be changed by the user on the device. This then overwrites the value parameterised by the ETS and is retained even after a device restart or bus voltage failure.	

Increasing the set temperature cooling standby	0 ... 3 ... 10
The standby set temperature for cooling is raised by this value compared to the comfort temperature in the "Cooling" operating mode. The parameter is only visible in the "Cooling" or "Heating and cooling" operating mode. This increase can also be changed by the user on the device. This then overwrites the value parameterised by the ETS and is retained even after a device restart or bus voltage failure.	

Increasing the set temperature cooling night	0 ... 4 ... 10
The night temperature for cooling is increased by this value compared to the comfort temperature in the "Cooling" operating mode. The parameter is only visible in the "Cooling" or "Heating and cooling" operating mode. This increase can also be changed by the user on the device. This then overwrites the value parameterised by the ETS and is retained even after a device restart or bus voltage failure.	

Frost protection set temperature	7 ... 40
This parameter sets the target temperature for frost protection. If the actual temperature falls below this value, then it is adjusted to the value parameterised at this point so that the room temperature does not fall below this set temperature. This function is independent of the currently active operating mode. In addition, the temperature parameterised here represents the lower limit for the setpoint adjustment on the device and also limits all setpoint specifications that are made via objects. The parameter is only visible in the "Heating" or "Heating and cooling" operating mode.	

Heat protection set temperature	7 ... 35 ... 45
This parameter sets the target temperature for heat protection. If the actual temperature exceeds this value, then it is adjusted to the value parameterised at this point so that the room temperature does not rise above this set temperature. This function is independent of the currently active operating mode. In addition, the temperature parameterised here represents the upper limit for the setpoint adjustment on the device and also limits all setpoint specifications that are made via objects. The parameter is only visible in the "Cooling" or "Heating and cooling" operating mode.	

Transmission on set temperature change by (0 = inactive)	0 ... 5 ... 30
Determines the size of the value change from the setpoint value, after which the current value is automatically transmitted to the bus via the "Set temperature" and "Current setpoint adjustment" object. With the setting "0", the set temperature is not transmitted automatically when it is changed.	

Cyclical transmission of the set temperature (0 = inactive)	0 ... 255
This parameter specifies whether the set temperature is to be transmitted cyclically via the "Set temperature" and "Current setpoint adjustment" object. Definition of the cycle time by this parameter. With the setting "0", the set temperature is not transmitted cyclically.	

12.11.3 Control value and status output

Output of the heating control value	Normal (energised means open), Inverted (energised means closed)
At this point it is determined whether the control value telegram for heating is to be output normally or inverted. This parameter is only visible if the operating mode "Heating" or "Heating and cooling" is configured.	

Output of the cooling control value	Normal (energised means open), Inverted (energised means closed)
At this point it is determined whether the control value telegram for cooling is to be output normally or inverted. This parameter is only visible if the operating mode "Cooling" or "Heating and cooling" is configured.	

Heating message	Active, inactive
Depending on the set operating mode, a separate object can be used to signal whether heating energy is currently being requested by the controller and thus whether heating is active. Activating this parameter enables the "Heating message" object.	

Cooling message	Active, inactive
Depending on the set operating mode, a separate object can be used to signal whether cooling energy is currently being requested by the controller and thus whether cooling is active. Activating this parameter enables the object "Message cooling".	

Automatic sending on change by (0 = inactive)	0 ... 3 ... 100
This parameter determines the size of the control value change, after which continuous control value telegrams are automatically transmitted via the control value objects. Accordingly, this parameter only affects control values that are parameterised to "Continuous PI control" and the 1-byte additional control value objects of the "Switching PI control (PWM)".	

Cycle time for automatic sending (0 = inactive)	0 ... 10 ... 255
This parameter defines the time interval for cyclically sending the control values across all control value objects.	

Cycle time of the switching control value	1 ... 15 ... 255
This parameter sets the cycle time for pulse width-modulated control values (PWM). This parameter therefore only affects control values that are parameterised to "Switching PI control (PWM)".	

12.11.4 Controller functionality

Switch off controller (dew point operation)	No, Via bus
This parameter enables the "Disable controller" object. If the controller is disabled, control is not possible until it is enabled again (control values = 0).	

12.11.5 Fan control

Number of fan stages	1 fan stage, 2 fan stages, 3 fan stages
The fan control of the room thermostat supports up to 3 fan stage outputs, whereby the actually used number of stages (1...3) can be set by this parameter. The fan control display is not adjusted on the device.	

Fan stage switching via	Switch objects (1 bit), value object (1 byte)
Depending on the data format of the objects of the controlled actuators, the fan stages can be switched either via up to 3 separate 1-bit objects or alternatively via one 1-byte object. The "Fan stage switching via" parameter specifies the data format of the controller. With the 1-bit objects, each fan stage discretely receives its own object. With the 1-byte object, the active fan stage is expressed by a value ("0" = fan OFF / "1" = stage 1 / "2" = stage 2 / "3" = stage 3).	

Threshold fan off → stage 1	1 ... 100
In automatic operation, the control value of the controller is used internally in the device for automatic control of the fan stages. For the transition between the stages, threshold values are defined in relation to the control value of the controller, which can be set at this point. If the control value reaches the threshold value of a stage during an increase of the control value, the respective stage is activated. If the control value reaches the threshold value minus the configured hysteresis during a reduction of the control value, switching to the next lower fan stage takes place.	

Threshold fan stage 1 → stage 2	1 ... 30 ... 100
See above	

Threshold fan stage 2 → stage 3	1 ... 60 ... 100
See above	

Hysteresis between threshold values	1 ... 3 ... 50
When the control value of the room temperature control has fallen below the threshold value minus the hysteresis, the fan control switches back to the previous stage.	

Waiting time for stage switching	0 ... 2 ... 30
Due to the inertia of a fan motor, it is usually not possible to switch the fan stages at any short time intervals, i.e. the fan speed cannot vary at any speed. If the fan control works in automatic operation, the adjustable "Waiting time for stage switching" is observed when switching stages. The moment a threshold value is exceeded or undershot starts the timer of the waiting time. Only after the waiting time has elapsed does the device automatically switch the fan stage.	

Stage limitation (max. fan stage)	No stage limitation, fan stage 1, fan stage 2
To reduce the fan noise of a fan coil unit, the fan stage limitation can be activated. The stage limitation reduces the noise emission by limiting the maximum fan stage to the fan stage value configured at this point (limitation stage). The limitation can be switched on and off via the 1-bit object "Ventilation, stage limitation" and thus activated based on demand. The "Stage limitation" parameter is not checked for plausibility, which means that incorrect parameterisation is possible. For this reason, it must be ensured that no higher limitation stage is parameterised than the fan stages that are actually available. If a higher limitation stage is parameterised, the limitation is ineffective.	

Behaviour in forced position	No forced position, fan stage 1, fan stage 2, fan stage 3, fan stage OFF
The controller offers the option of activating a forced fan position via the bus. When the forced position is active, the fan stages cannot be controlled or switched in automatic or manual operation. The fan remains in the forced state until the forced state is deactivated via the bus. This allows the fan to be brought into a blocked and controlled state for service purposes, for example. As soon as the forced position is activated, the controller jumps to the fan stage parameterised in this parameter without a waiting time. The fan can also be switched off completely.	

Interpretation of fan control automatic / manual object	0 = automatic, 1 = manual, 1 = automatic, 0 = manual
The parameter determines the polarity of the object for switching between automatic and manual fan control. After a device reset, automatic operation is always active.	

Fan run-on time heating (0 = inactive)	0 ... 30
If the fan is switched off in automatic operation or in manual operation, it continues to run for the time parameterised at this point, provided a factor greater than "0" is set. This parameter is effective for the controller operating mode "Heating".	

Fan run-on time cooling (0 = inactive)	0 ... 30
If the fan is switched off in automatic operation or in manual operation, it continues to run for the time parameterised at this point, provided a factor greater than "0" is set. This parameter is effective for the controller operating mode "Cooling".	

Fan protection	Active, inactive
With the fan protection function, the fan of a fan coil unit that has not been in operation for a longer period of time can be temporarily switched to the maximum stage. In this way, the controlled fan motors can be protected against becoming stuck. In addition, dust formation on the fan blades, heat exchanger and fan coil unit is prevented. Activating this parameter enables the "Fan protection" object.	

Start-up via stage	Fan stage 1, fan stage 2, fan stage 3
The fan can be temporarily switched to a defined switch-on stage if it was previously switched off and is to be started. This switch-on stage can be any of the existing fan stages and is set by this parameter. The switch-on stage is usually one of the higher fan stages of a fan coil unit. The switch-on stage remains active for the "Waiting time for stage switching" configured in the ETS. The "Start-up via stage" parameter is not checked for plausibility in the ETS, which means that incorrect parameterisation is possible. For this reason, it must be ensured that no higher switch-on stage is parameterised than the fan stages that are actually available. The fan control automatically corrects an incorrect parameterisation by activating stage 1 for the start-up so that the fan starts up normally without a switch-on stage.	

Save manual fan stage when switching from comfort operation → night operation	**Active, inactive**
If active, the device saves the settings of the manual fan control when switching from comfort operation to night operation and retrieves these settings when switching from night operation to comfort operation. The saved settings are retained after a device restart or bus voltage failure. According to the parameter "Overwrite controller settings on the device during ETS programming operation", the settings are retained even after an ETS programming operation. If not active, the controller discards the manual fan stage settings when the operating mode is switched to night operation.	

Fan control standby	**Auto, Minimum Auto Fan Stage 1, Minimum Auto Fan Stage 2, Fixed Fan Stage OFF, Fixed Fan Stage 1, Fixed Fan Stage 2, Fixed Fan Stage 3**
This parameter configures the fan control for standby operation. Auto: For this energy level, the fan control operates in automatic operation. Minimum Auto Fan Stage 1: For this energy level, the fan control operates in automatic operation. This setting specifies that fan stage 1 is the minimum fan stage that can be set. Consequently, the device never switches off the fan at this energy level. Minimum Auto Fan Stage 2: For this energy level, the fan control operates in automatic operation. This setting specifies that fan stage 2 is the minimum fan stage that can be set. Consequently, the device never switches the fan to fan stage 1 or off at this energy level. Fixed Fan Stage OFF: For this energy level, the fan control is permanently switched off. Fixed Fan Stage 1: For this energy level, the fan control is permanently set to fan stage 1. Fixed Fan Stage 2: For this energy level, the fan control is permanently set to fan stage 2. Fixed Fan Stage 3: For this energy level, the fan control is permanently set to fan stage 3.	

Fan control night	**Auto, Minimum Auto Fan Stage 1, Minimum Auto Fan Stage 2, Fixed Fan Stage OFF, Fixed Fan Stage 1, Fixed Fan Stage 2, Fixed Fan Stage 3**
This parameter configures the fan control for the "Night operation" operating mode. The setting is made in the same way as the setting of the parameter "Fan control standby operation".	

12.12 Objects

Object no.	Function	Name	Type	DPT	Flag
223	RTR – Input	Basic setpoint value	2 bytes	DPST-9-1	K, S, A
Object for external specification of the basic setpoint value. The possible value range is limited by the parameterised "Set temperature frost protection" and "Set temperature heat protection" depending on the operating mode. Values outside the value range are limited to the next possible value. The temperature value must always be specified in the format "°C".					

Object no.	Function	Name	Type	DPT	Flag
224	RTR – Input	Switching operating mode	1 byte	DPST-20-102	K, S, A
Object for switching the operating mode of the controller according to the KNX specification. A received value influences the operating mode icon on the device.					

Object no.	Function	Name	Type	DPT	Flag
225	RTR – Input	Forced object operating mode	1 byte	DPST-20-102	K, S, A
Object for forced switching (highest priority) of the operating mode of the controller according to the KNX specification. A received value influences the operating mode icon on the device.					

Object no.	Function	Name	Type	DPT	Flag
226	RTR – Input	Setpoint adjustment setting	2 bytes	DPST-9-2	K, S, A
Object for specifying a basic setpoint adjustment in Kelvin, e.g. by a controller extension. The value "0" means that adjustment is not active. Values between -670760 K and 670760 K can be specified. If the limits of the value range are exceeded by the external value specification, the controller automatically resets the received value to the minimum or maximum limit. This object is only available if the "Type of setpoint adjustment" parameter is set to "Via offset (DPT 9.002)". When a value is received via the object, the display of the setpoint value and the state of the slider on the device are adjusted.					

Object no.	Function	Name	Type	DPT	Flag
226	RTR – Input	Setpoint adjustment setting	1 byte	DPST-6-10	K, S, A
Object for specifying a basic setpoint adjustment, e.g. by a controller extension. The value of a count value in the object depends on the parameter "Value of setpoint adjustment". The value "0" means that adjustment is not active. The value representation is in two's complement in positive and negative direction. If the limits of the value range are exceeded by the external value specification, the controller automatically resets the received value to the minimum or maximum limits. This object is only available if the "Type of setpoint adjustment" parameter is set to "Via stages (DPT 6.010)". When a value is received via the object, the display of the setpoint value and the state of the slider on the device are adjusted.					

Object no.	Function	Name	Type	DPT	Flag
228	RTR – Input	Window status	1 bit	DPST-1-19	K, S, A
Object for coupling window contacts for automatic switching to frost / heat protection operating mode. Polarity: Window opened = "1", window closed = "0".					

Object no.	Function	Name	Type	DPT	Flag
229	RTR – Input	Outdoor temperature	2 bytes	DPST-9-1	K, S, A
Object for detecting the outdoor temperature. The temperature value must always be specified in the format "°C".					

Object no.	Function	Name	Type	DPT	Flag
230	RTR – Input	Disabling controller	1 bit	DPST-1-1	K, S, A
Object for deactivating the controller (activating dew point operation). Polarity: controller deactivated = "1", controller activated = "0". This object is only available if "Switch off controller (dew point operation)" is parameterised to "Via bus".					

Object no.	Function	Name	Type	DPT	Flag
231	RTR – In- / output	Heating/cooling switchover	1 bit	DPST-1-100	K, S, Ü, A
Object for transmitting the automatically set operating mode ("Heating" or "Cooling") of the controller if "Switching between heating and cooling" is parameterised to "automatic". If the parameter is set to "Via object (Heating / cooling switching)", the operating mode can be specified via the object. Object value "1" = heating; object value "0" = cooling.					

Object no.	Function	Name	Type	DPT	Flag
232	General – Output	Actual temperature	2 bytes	DPST-9-1	K, Ü, A
Object for outputting the actual temperature (room temperature) determined by the controller. Measuring range internal temperature sensor: 0 °C to +40 °C. The temperature value is always output in the format "°C".					

Object no.	Function	Name	Type	DPT	Flag
233	General – Input	External temperature value	2 bytes	DPST-9-1	K, S, A
Object for coupling an external KNX room temperature sensor. This allows cascading of several temperature sensors for room temperature measurement. The temperature value must always be specified in the format "°C". The object is only enabled if the "Temperature detection by" parameter is set to "External sensor", "Internal or external sensor" or "External sensor and external temperature sensor".					

Object no.	Function	Name	Type	DPT	Flag
234	RTR – Output	Set temperature	2 bytes	DPST-9-1	K, Ü, A
Object for outputting the current temperature setpoint. The possible value range is limited by the parameterised "Set temperature frost protection" and "Set temperature heat protection" depending on the operating mode. The temperature value is always output in the format "°C".					

Object no.	Function	Name	Type	DPT	Flag
235	RTR – Output	Current setpoint adjustment	2 bytes	DPST-9-2	K, Ü, A
Object for feedback of the current basic setpoint adjustment in Kelvin, for evaluation e.g. by a controller extension. The value "0" means that adjustment is not active. This object is only available if the "Type of setpoint adjustment" parameter is set to "Via offset (DPT 9.002)". The object is always transmitted synchronously with the "Set temperature" object on the bus.					

Object no.	Function	Name	Type	DPT	Flag
235	RTR – Output	Current setpoint adjustment	1 byte	DPST-6-10	K, Ü, A
Object for feedback of the current basic setpoint adjustment for evaluation, e.g. by a controller extension. The value of a count value in the object depends on the parameter "Value of setpoint adjustment". The value "0" means that adjustment is not active. The value representation is in two's complement in positive and negative direction. This object is only available if the "Type of setpoint adjustment" parameter is set to "Via stages (DPT 6.010)". When the set temperature is changed by an operation on the device, a telegram with the selected setpoint adjustment is transmitted. The object is always transmitted synchronously with the "Set temperature" object on the bus.					

Object no.	Function	Name	Type	DPT	Flag
236	RTR – Output	Temperature drop detection	1 bit	DPST-1-19	K, Ü, A
Object for reporting a temperature drop to the KNX. This object is only available if the "Frost / heat protection" parameter is set to "Frost protection automatic operation". The device reports a temperature drop if the temperature drops by a parameterisable value in K within a specific time in min ("Frost protection automatic temperature drop" parameter). Object value = "1": temperature drop detection, object value = "0": no temperature drop detection.					

Object no.	Function	Name	Type	DPT	Flag
237	RTR – Output	KNX status operating mode	1 byte	DPST-20-102	K, Ü, A
Object via which the controller outputs the current operating mode. When the operating mode is switched by operating the device, a telegram with the newly selected operating mode is transmitted.					

Object no.	Function	Name	Type	DPT	Flag
238	RTR – Output	Controller status	1 byte	DPST-5-10	K, Ü, A
Object via which the controller outputs the current operating status.					

Object no.	Function	Name	Type	DPT	Flag
240	RTR – Output	KNX status	2 bytes	DPST-22-101	K, Ü, A
Object via which the KNX-harmonised controller displays elementary basic functions.					

Object no.	Function	Name	Type	DPT	Flag
239	RTR – Output	Additional status message	1 byte	DPST-5-10	K, Ü, A
Object via which the controller outputs the current extended operating status.					

Object no.	Function	Name	Type	DPT	Flag
244	RTR – Output	Heating message	1 bit	DPST-1-1	K, Ü, A
Object for reporting to the controller whether heating energy is requested. Object value = "1": energy demand, object value = "0": no energy demand.					

Object no.	Function	Name	Type	DPT	Flag
245	RTR – Output	Cooling message	1 bit	DPST-1-1	K, Ü, A
Object for reporting to the controller whether cooling energy is requested. Object value = "1": energy demand, object value = "0": no energy demand.					

Object no.	Function	Name	Type	DPT	Flag
246	RTR – Output	Heating control value	1 byte	DPST-5-1	K, Ü, A
Object for outputting the continuous control value of the heating mode. This object is only available in this way if the type of heating control is parameterised to "Continuous PI control".					

Object no.	Function	Name	Type	DPT	Flag
246	RTR – Output	PWM control value heating	1 byte	DPST-5-1	K, Ü, A
Object for outputting the continuous control value of the heating mode. This object is only available in this way if the type of heating control is parameterised to "Continuous PI control".					

Object no.	Function	Name	Type	DPT	Flag
247	RTR – Output	Heating control value (PWM)	1 bit	DPST-1-1	K, Ü, A
Object for outputting the PWM control value of the heating operation. This object is only available in this way if the type of heating control is parameterised to "Switching PI control (PWM)".					

Object no.	Function	Name	Type	DPT	Flag
247	RTR – Output	Heating control value (2-point)	1 bit	DPST-1-1	K, Ü, A
Object for outputting the 2-point control value of the heating operation. This object is only available in this way if the type of heating control is parameterised to "Switching 2-point control".					

Object no.	Function	Name	Type	DPT	Flag
248	RTR – Output	Cooling control value	1 byte	DPST-5-1	K, Ü, A
Object for outputting the continuous control value of the cooling operation. This object is only available in this way if the type of cooling control is parameterised to "Continuous PI control".					

Object no.	Function	Name	Type	DPT	Flag
248	RTR – Output	PWM control value cooling	1 byte	DPST-5-1	K, Ü, A
Object for outputting the continuous control value of the cooling operation. This object is only available in this way if the type of cooling control is parameterised to "Switching PI control (PWM)".					

Object no.	Function	Name	Type	DPT	Flag
248	RTR – Output	PWM control value cooling	1 byte	DPST-5-1	K, Ü, A
Object for outputting the continuous control value of the cooling operation. This object is only available in this way if the type of cooling control is parameterised to "Switching PI control (PWM)".					

Object no.	Function	Name	Type	DPT	Flag
249	RTR – Output	Cooling control value (PWM)	1 bit	DPST-1-1	K, Ü, A
Object for outputting the PWM control value of the cooling operation. This object is only available in this way if the type of cooling control is parameterised to "Switching PI control (PWM)".					

Object no.	Function	Name	Type	DPT	Flag
249	RTR – Output	Cooling control value (2-point)	1 bit	DPST-1-1	K, Ü, A
Object for outputting the 2-point control value of the cooling operation. This object is only available in this way if the type of cooling control is parameterised to "Switching 2-point control".					

Object no.	Function	Name	Type	DPT	Flag
259	RTR – Input	Ventilation, forced position	1 bit	DPST-1-1	K, S, A
Object for activating the forced fan position. Polarity: forced position ON = "1"; forced position OFF = "0".					

Object no.	Function	Name	Type	DPT	Flag
260	RTR – Input	Ventilation, stage limitation	1 bit	DPST-1-1	K, S, A
Object for activating the fan stage limitation. Polarity: fan stage limitation ON = "1"; fan stage limitation OFF = "0".					

Object no.	Function	Name	Type	DPT	Flag
261	RTR – Input	Ventilation, fan protection	1 bit	DPST-1-1	K, S, A
Object for activating the fan protection. Polarity: fan protection ON = "1"; fan protection OFF = "0".					

Object no.	Function	Name	Type	DPT	Flag
262	RTR – Input	Ventilation auto / manual setting	1 bit	DPST-1-1	K, S, A
Object for specifying the fan operating mode ("1" = auto; "0" = manual). Object serves as an input for control by a controller extension with fan control. When receiving a value via the object, the display of the value on the device is adjusted.					

Object no.	Function	Name	Type	DPT	Flag
263	RTR – Input	Fan speed setting	1 byte	DPST-5-10	K, S, A
Object for setting the fan stage. Object serves as an input for control by a controller extension with fan control. The specified value is only taken into account if the ventilation is in manual mode. Value meaning: "0" = fan OFF, "1" = stage 1 active, "2" = stage 2 active and "3" = stage 3 active. This object is only available in this way if the fan control is to take place via 1 byte (parameter-dependent). When receiving a value via the object, the display of the value and the state of the fan symbol on the device are adjusted.					

Object no.	Function	Name	Type	DPT	Flag
265	RTR – Output	Ventilation, fan stage 1–3	1 byte	DPST-5-10	K, Ü, A
Object for value-based control of the fan stages. This object is only available in this way if the fan control is to take place via 1 byte (parameter-dependent). Value meaning: "0" = fan OFF, "1" = stage 1 active, "2" = stage 2 active and "3" = stage 3 active. This object is only available in this way if the fan control is to take place via 1 byte (parameter-dependent).					

Object no.	Function	Name	Type	DPT	Flag
265	RTR – Output	Ventilation, fan stage 1	1 byte	DPST-1-1	K, Ü, A
Object for switching control of the first fan stage. This object is only available in this way if the fan control is to take place via 3 x 1 bit and at least one fan stage is enabled (parameter-dependent).					

Object no.	Function	Name	Type	DPT	Flag
266	RTR – Output	Ventilation, fan stage 2	1 bit	DPST-1-1	K, Ü, A
Object for switching control of the second fan stage. This object is only available in this way if the fan control is to take place via 3 x 1 bit and at least two fan stages are enabled (parameter-dependent).					

Object no.	Function	Name	Type	DPT	Flag
267	RTR – Output	Ventilation, fan stage 3	1 bit	DPST-1-1	K, Ü, A
Object for switching control of the first fan stage. This object is only available in this way if the fan control is to take place via 3 x 1 bit and at least three fan stages are enabled (parameter-dependent).					

Object no.	Function	Name	Type	DPT	Flag
268	RTR – Output	Ventilation auto / manual feedback	1 bit	DPST-1-1	K, Ü, A
Object for feedback of the current fan operating mode (polarity parameterisable). Object serves as an output for feedback to a controller extension with fan control. When the operating mode is switched by an operation on the device, a telegram corresponding to the current state is transmitted to the bus.					

Object no.	Function	Name	Type	DPT	Flag
269	RTR – Output	Fan speed feedback	1 byte	DPST-5-10	K, Ü, A
Object for additional value-based feedback of the active fan stage. Value meaning: "0" = fan OFF, "1" = stage 1 active, "2" = stage 2 active and "3" = stage 3 active. This object is only available in this way if the fan control is to take place via 1 byte (parameter-dependent). When tapping the slider on the fan control page on the device, this object is transmitted to the bus with the newly selected value with a delay of 2 s. When tapping the plus or minus symbol, this object is sent to the bus with the newly selected value with a delay of 2 s.					

13. Controller extensions

A controller can be used for individual room temperature control. Depending on the operating mode, the current temperature setpoint value and the room temperature, actuating variables for heating or cooling control and for fan control can be transmitted to the KNX.

As a rule, these control values are then evaluated by a suitable KNX actuator system, e.g. heating or switch actuators, or directly via bus-compatible valve drives and converted into physical values for room climate control. Only the main unit transmits control value telegrams.

A controller extension is not involved in temperature control as such. It enables users to operate the individual room control, i.e. the controller main unit, from different points in a room. This way, any number of control extension units can be set up. The controller extensions can also be used to actuate central heating control units, which may be located in a distribution box, for example.

This chapter describes the functions of the room thermostats acting as extension units.

13.1 Linking with the room thermostat

13.1.1 Functionality

The controller extension can be activated to control a KNX room thermostat. The controller extension function is enabled by the "Controller extensions" parameter in the "General" parameter node. The number of controller extensions is defined in the "Controller extensions" parameter node.

Typical KNX room thermostats usually offer various options that can be used to influence or visualise the room temperature control:
- Switching between different operating modes (e.g. "Comfort", "Night" …), to which different setpoint temperatures are assigned in the controller.
- Adjustment of the setpoint temperature in increments, each of which is related to the parameterised setpoint temperature of the current operating mode (basic setpoint adjustment).

The controller extension will only work correctly if all extension objects are connected to the corresponding objects of the room thermostat. It is also possible to have multiple controller extensions acting on a controller main unit.

The following communication objects update automatically after a reset or after an ETS programming operation if the initialisation flag for these objects is set. Updating takes place by means of value read telegrams to the room thermostat. The latter must reply with value responses. If all or some of the responses are not received by the device, the affected objects will be initialised with "0". In this case, the objects will first have to be actively written to by the bus after a reset.

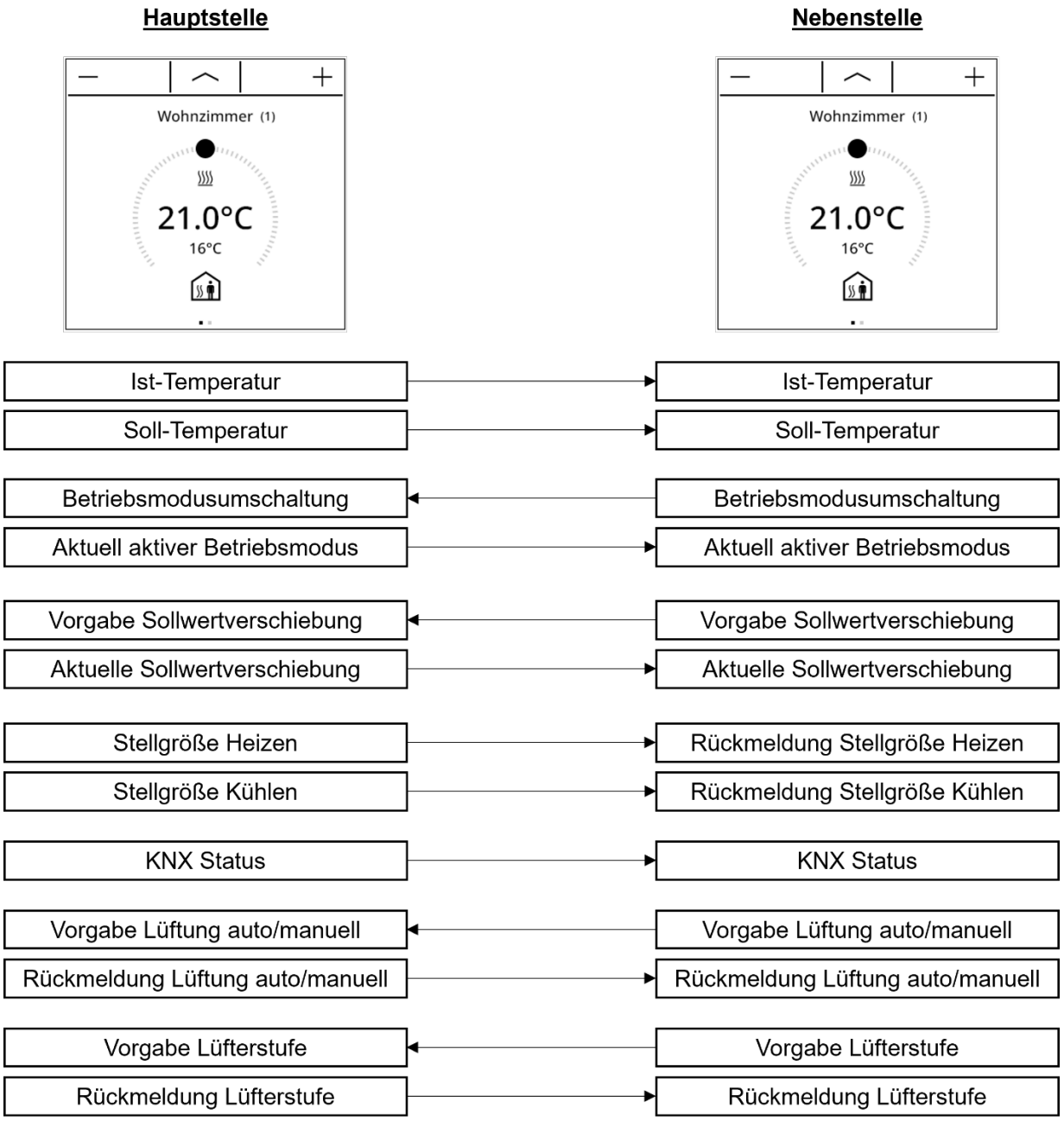
- Actual temperature
- Set temperature
- Currently active operating mode
- KNX status
- Ventilation auto / manual feedback
- Fan speed feedback
- Heating control value feedback
- Cooling control value feedback

In addition to the operating function, the controller extension also has a display function. On the display of the device, just as on the controller main unit, various status information of the temperature control can be shown. Since the displayed states and information and also some operating functions depend strongly on the parameterisation of the controller main unit, the controller extension unit must also be parameterised and thus matched to the functions of the controller main unit.

13.1.2 Communication objects

Objects with identical functions can be linked to each other via identical group addresses, which also enables multiple controller extensions to act on one controller main unit.

The following example shows the linking of an LS Touch as a temperature controller and another LS Touch as a controller extension, where temperature control has the following properties:
- Continuous PI control for heating and cooling
- Fan control activated for heating and cooling
- Operating functions



13.2 Operation

13.2.1 Favourites page 1-gang, 2-gang or 3-gang display (top or right)

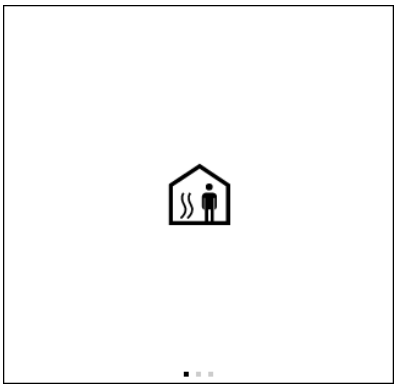


Fig. 147: Extension unit operation
Favourites, 1-gang

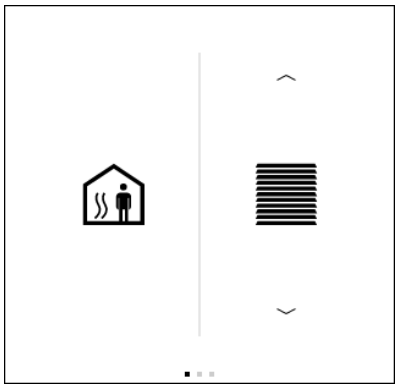


Fig. 148: Extension unit operation
Favourites, 2-gang

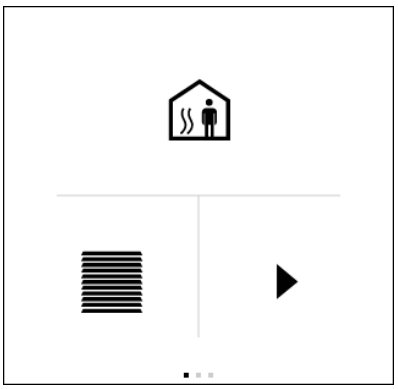


Fig. 149: Extension unit operation
Favourites, 3-gang top

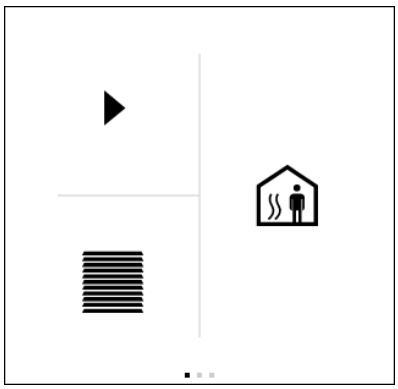


Fig. 150: Extension unit operation
Favourites, 3-gang right

Tap the centre of the control element (icon):
Switching operating mode

Press and hold the centre of the control element (value):
Detail page is shown

13.2.2 Favourites page 3-gang (top or bottom left) or 4-gang display

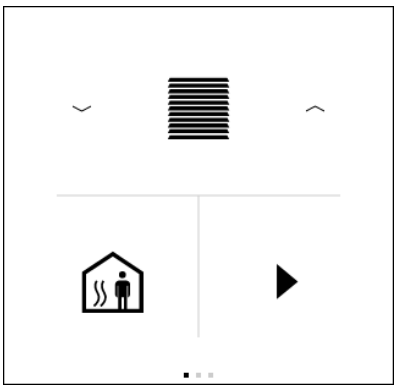


Fig. 151: Extension unit operation
Favourites, 3-gang bottom left

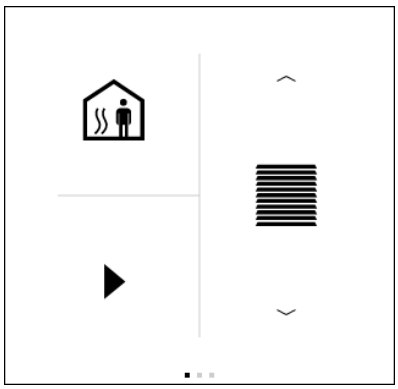


Fig. 152: Extension unit operation
Favourites, 3-gang top left

Fig. 153: Extension unit operation favourites, 4-gang

Tap the centre of the control element (icon):
Send configured scene number via the "Scene extension" object

Press and hold the centre of the control element (value):
Detail page is shown

13.2.3 Switching operating mode

On the detail page of the controller extension, the operating mode of the main controller can be switched with the "Operating mode" icon.

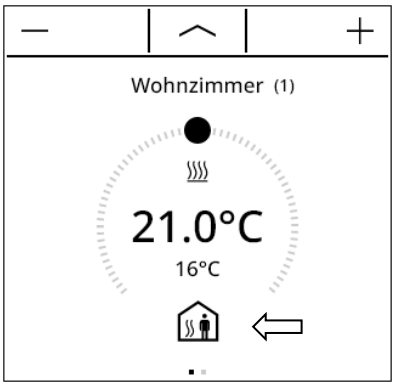


Fig. 154: Changing the extension unit operating mode

Switching of the controller operating mode is done using a 1-byte communication object. The "Switching operating mode" object provides the option to choose between the following modes:
- Comfort mode
- Standby mode
- Night mode
- Frost / heat protection mode

In order for switching from one mode to the other to work correctly from different positions, the operating mode objects of the controller and the operating mode objects of all controller extensions must be connected to each other and have the "write flag" set. This flag is also set by default at the affected objects. By checking the connected switching operating mode object, the controller extension determines which of the possible operating modes is active. This information is used to switch to the next operating mode when a button is pressed.

The frost protection symbol can be shown or hidden in the parameters of the controller extensions:

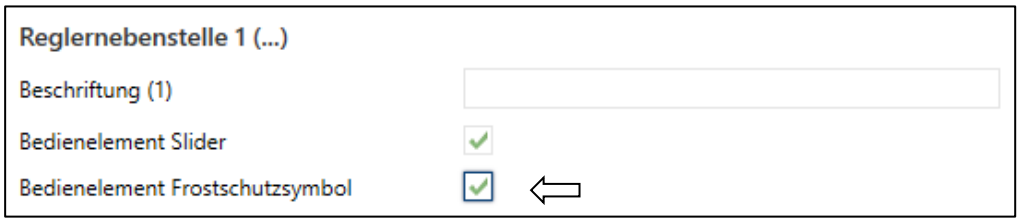


Fig. 155: Showing or hiding frost protection symbol for extension

- Activated: When pressing the operating mode icon, the 1-byte communication object switches between Comfort → Standby → Night → Frost/heat protection
- Deactivated: When pressing the operating mode icon, the 1-byte communication object switches between Comfort → Standby → Night

13.2.4 Setpoint adjustment

The setpoint adjustment is available as a further function of the controller extension.
This extension unit function can be used to set the temperature basic setpoint on a room thermostat with the slider or the "+" and "-" buttons. Operation at the extension unit is usually the same as at the controller main unit.

- Each actuation of "-" or "+" decreases or increases the value of the setpoint adjustment in the increment specified by the controller main unit.
- When setting with the slider, the extension unit calculates how many increments the setpoint should be increased or decreased.

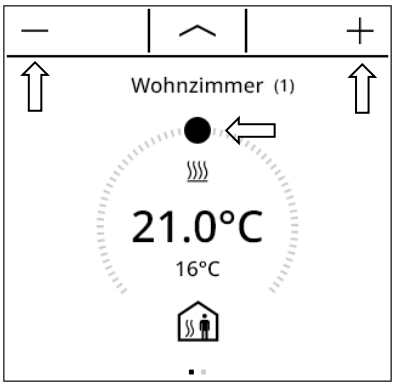


Fig. 156: Adjusting the extension unit setpoint value

Communication with the controller main unit:
In order for the controller extension to be able to carry out a setpoint adjustment on a room thermostat, the controller must have input and output objects for setpoint adjustment. The output object of the controller must be connected to the input object of the extension unit and the input object of the controller must be connected to the output object of the extension unit via a separate group address in each case. All objects have the same data point type and value range. A setpoint adjustment is interpreted by count values: an adjustment in positive direction is expressed by positive values, an adjustment in negative direction is implemented by negative object values. An object value of "0" means that no setpoint adjustment has been set.

The extension units recognise the current position of the setpoint adjustment via the "Current setpoint adjustment" object. Based on the value of the communication object, the setpoint is adjusted in the corresponding direction at an extension. Each time the setpoint is adjusted, the new adjustment is transmitted to the room thermostat via the "Setpoint adjustment setting" object. The controller itself checks the received value for its minimum and maximum temperature limits and sets the new setpoint adjustment if valid. If the new count value is validly accepted, the controller applies this value to its setpoint adjustment output object and sends the value back to the extension units as a positive feedback.

Due to the use of the uniform data point type as output and input object of the controller extension and the weighting of the individual stage by the controller itself, each individual extension unit is able to determine that an adjustment has taken place, in which direction adjustment was made and how much the setpoint has been adjusted. As a prerequisite, the corresponding communication objects must be connected to all controller extension units and the controller.

The information of the increment value as a feedback from the controller enables the extension unit to resume the adjustment at the correct position at any time. The extension units can also react to a reset of the setpoint adjustment by the controller.

13.2.5 Type of setpoint adjustment

With the "Type of setpoint adjustment" parameter, you define how the controller extension unit is to carry out and evaluate a setpoint adjustment of the main unit.

Fig. 157: Extension unit type of setpoint adjustment

The controller extension unit uses an offset (DPT 9.002) to send a setpoint adjustment as a 2-byte floating point value – temperature difference (K).

Example: The set temperature is 20 °C.
- The user sets the slider in the display to 22.3 °C.
- A setpoint adjustment of 2.3 K is sent to the main unit.
- The main unit returns a setpoint temperature of 22.3 °C.

Using an offset (DPT 6.001), the controller extension unit sends a setpoint adjustment as 1-byte count impulses (-128…127). The value for the setting is configured in the parameter.

Example: The set temperature is 20 °C.
- The value of setpoint adjustment is 0.5 K.
- The user sets the slider in the display to 22.3 °C.
- A setpoint adjustment by a factor of 5 is transmitted to the main unit.
- The main unit returns a setpoint temperature of 22.5 °C.

13.2.6 Fan control

On the second detail page of the controller extension, the fan control of the main controller can be influenced.

The Auto / Man button at the bottom of the displays is used for switching between automatic and manual fan control on the main unit.

If the fan control is set to manual, the desired fan stage can be selected using the slider or the "+" and "-" buttons.

Operation at the extension unit is usually the same as at the controller main unit.

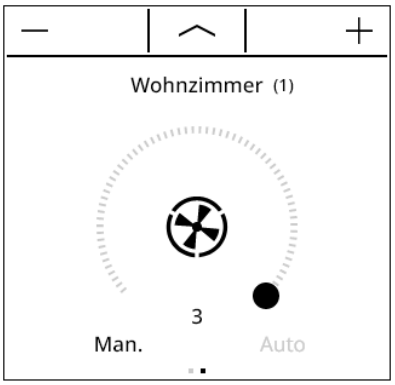


Fig. 158: Extension unit fan control

13.3 Display functions

13.3.1 Display of the controller operating mode

The controller extension unit can indicate the currently active operating mode for the controller in the display. As on the controller itself, the mode is represented by the Comfort, Standby, Night and Frost/heat protection symbols.

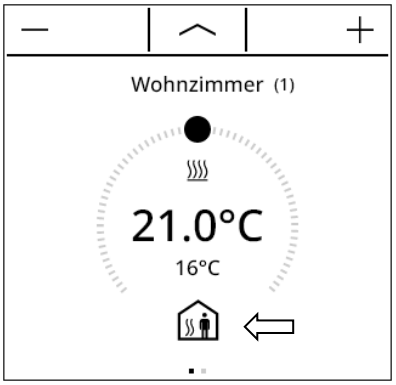


Fig. 159: Extension unit operating mode display

This display information is retrieved from the communication objects "RNSn - Input KNX status" and "RNSn - Input currently active operating mode". These objects have to be connected with the functionally identical objects of the controller main unit! It is not possible to distinguish on the display whether the operating mode was set by a forced object or by "normal" operating mode switching. Switching the operating mode is possible via the operating function of the controller extension.

13.3.2 Display of the set and actual temperature

The controller extension shows the setpoint temperature of the room thermostat in large format in the display. If the "Slider" control element is activated in the parameter of the controller extension, the slider also displays the set temperature.

The actual temperature of the room thermostat is displayed in the small format as shown below.

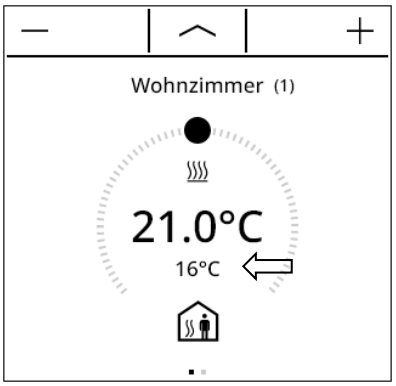


Fig. 160: Extension unit actual temperature display in small format

13.3.3 Display of control values for heating and cooling

In the display for the heating or cooling system, the controller can indicate whether heating or cooling energy is currently being requested. The information is shown using the symbols for heating or cooling.

Fig. 161: Extension unit heating and cooling symbols

For the display to work, the communication objects for the controller's control values of the heating mode and/or cooling mode of the extension unit and main unit must be connected to each other.

13.3.4 Display of fan stages

As with a controller main unit, a controller extension unit can also show the current fan stage of a fan control in the display. The mode of operation of the fan symbol control does not differ compared to the controller main unit function.

Fig. 162: Extension unit fan stage icons

For the display of the fan stages to work, the "RNSn - Input feedback fan stage" communication object must be connected to the object with the same function in the controller main unit.

The fan stage display must be enabled separately at the controller extension by the "Fan control active" parameter.

13.4 Behaviour after device restart

The various display and operating functions of the controller extension unit are controlled via various communication objects as described in the previous chapters. To ensure that all status information is validly available when the extension is initialised after a programming operation or after bus voltage return, a controller main unit must transmit the current states to the extensions, i.e. update the communication objects. This is done automatically for some objects during the initialisation of the main unit.

To ensure that all objects are initialised properly, some communication objects of the controller extension can optionally initialise automatically after a device reset. For this purpose, the initialisation flag for these corresponding input objects can be set in the ETS.

By selecting the controller extension(s) (1) and entering "Input" in the search box (2), you can select all input objects simultaneously (3) and set all initialisation flags (3) in the properties window.

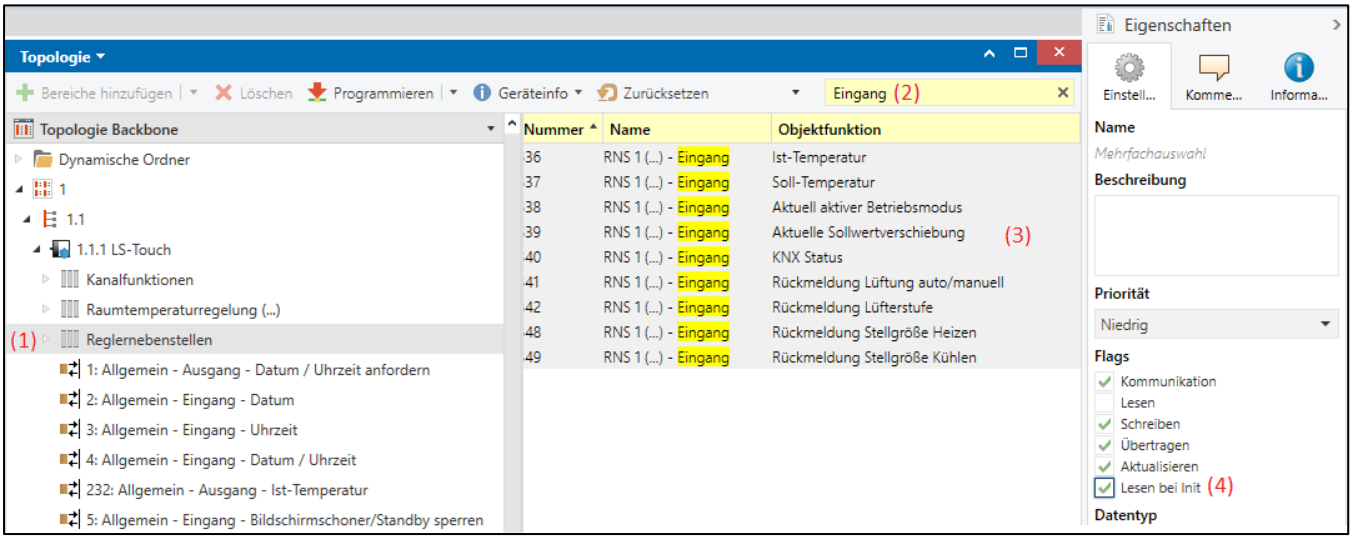


Fig. 163: Setting the initialisation flags of all input objects in the ETS

After a reset, the update is then carried out by sending value read telegrams to the room thermostat. The latter must respond by means of value responses. If all or some of the responses are not received by the extension, the affected objects will be initialised with "0". In this case, the objects will first have to be actively written to by other bus participants, e.g. by automatic transmission from the controller main unit.

13.5 Parameters

Number of controller extensions	**1 ... 4**
The value determines the number of controller extensions that can be used on the device. A detail page for setting the operating mode and the setpoint adjustment is created on the device for each controller extension.	

Inscription	**Free text with max. 28 characters** **Default: empty**
The text is displayed as the heading of the controller extension page. In addition, the text entered in this parameter is used to identify the controller extension page in the ETS parameter window and is carried over in the name of the objects.	

Slider control	Active, inactive
If activated, a slider for entering the set temperatures is shown on the controller extension page of the display. If the parameter is not active, then the set temperature can only be changed using the plus and minus push-buttons.	

Frost protection symbol control	Active, inactive
On the controller extension page of the display, the current operating mode is shown below the actual temperature by means of the operating mode icon. You can switch between the operating modes by tapping this icon. If this parameter is active, then the frost protection mode can also be activated by means of switching. If the parameter is not active, then the frost protection mode cannot be selected on the device.	

Fan control active	Active, inactive
A fan control can be added to the controller extension by means of this parameter. This creates a second page for fan control on the device in addition to the detail page for setting the operating mode and the setpoint adjustment. By enabling the fan control, it is possible to control the fan of air circulating heating or cooling systems, such as fan coil units, depending on the control value calculated in the controller and also by manual operation. If the function is enabled, further parameters and additional objects appear in the ETS.	

Operating mode	Heating, Cooling, Heating and cooling
In addition to the operating function, the controller extension also has a display function. On the display of the device, just as on the controller main unit, various status information of the temperature control can be shown. Since the displayed states and information and also some operating functions depend strongly on the parameterisation of the controller main unit, the controller extension unit must also be parameterised and thus matched to the functions of the controller main unit. Make sure that the settings correspond to those of the controller main unit! Some parameters may not be visible due to the controller operating mode setting.	

Type of setpoint adjustment	Via stages (DPT 6.010), Via offset (DPT 9.002)
The parameter specifies the data type for the communication objects of the room thermostat (controller main unit) with a controller extension. Depending on the setting of the "Type of setpoint adjustment" parameter, the adjustment is made via the 2-byte object "Specified setpoint adjustment (according to KNX DPT 9.002)" or via the 1-byte object "Specified setpoint adjustment (according to KNX DPT 6.010)". For a basic setpoint adjustment, the controller extension uses the two objects "Specified setpoint adjustment" and "Current setpoint adjustment". The "Current setpoint adjustment" object informs the extension unit of the current status of the room thermostat. If an adjustment of the set temperature is made on the device, then this adjustment is converted into a setpoint adjustment with the help of the value of the "Current setpoint adjustment" object and transmitted to the controller main unit via the "Specified setpoint adjustment" object. However, with the setting "Type of setpoint adjustment" "Specified setpoint adjustment (according to KNX DPT 6.010)", the setpoint adjustment is first converted into a stage value by means of the parameter "Value of setpoint adjustment". To ensure that the stage value is interpreted correctly at the controller main unit, the same value must be set at the controller main unit as at the controller extension.	

Increment of the 4-stage setpoint adjustment	0.5 K, 1.0 K, 1.5 K, 2.0 K
This parameter defines the value of a stage of the basic setpoint adjustment. It is possible to adjust the basic setpoint value by up to 4 stages. This parameter is only relevant if "Via stages" has been parameterised for "Type of setpoint adjustment". Make sure that this setting corresponds to that of the controller main unit! The parameter also affects the adjustable value range for the temperature adjustment on the device. This means that only temperature values can be entered on the device that are between (- "value of set temperature" x 4) and (+ "value of set temperature" x 4) from the set temperature of the current operating mode.	

Switching between heating and cooling	Automatic, via object (heating / cooling switching)
If the mixed operating mode is parameterised, it is possible to switch between heating and cooling. Automatic: Switching takes place automatically depending on the operating mode and the room temperature. Via object (heating / cooling switching): Switching takes place exclusively via the "Heating / cooling switching" object.	

13.6 Objects

Object no.	Function	Name	Type	DPT	Flag
336	RNS 1 – Input	Actual temperature	2 bytes	DPST-9-1	K, S, A
Object for detecting the actual temperature. The received value is used exclusively for the indication on the display. The temperature value must always be specified in the format "°C". When receiving a value via the object, the display of the actual value on the device is adjusted.					

Object no.	Function	Name	Type	DPT	Flag
337	RNS 1 – Input	Set temperature	2 bytes	DPST-9-1	K, S, A
Object for receiving the current temperature setpoint. The device receives the temperature value in the format "°C". When a value is received via the object, the display of the setpoint value and the state of the slider on the device are adjusted.					

Object no.	Function	Name	Type	DPT	Flag
338	RNS 1 – Input	Currently active operating mode	1 byte	DPST-20-102	K, S, A
Currently active operating mode A received value influences the operating mode icon on the device.					

Object no.	Function	Name	Type	DPT	Flag
339	RNS 1 – Input	Current setpoint adjustment	2 bytes	DPST-9-2	K, S, A
Object for feedback of the current basic setpoint adjustment in Kelvin. The value "0" means that adjustment is not active. This object is only available if the "Type of setpoint adjustment" parameter is set to "Via offset (DPT 9.002)". This affects the slider on the controller extension page, provided that the display of the slider has been parameterised.					

Object no.	Function	Name	Type	DPT	Flag
339	RNS 1 – Input	Current setpoint adjustment	1 byte	DPST-6-10	K, S, A
Object via which the extension receives the current basic setpoint adjustment of the room thermostat. This object is only available if the "Type of setpoint adjustment" parameter is set to "Via stages (DPT 6.010)". This affects the slider on the controller extension page, provided that the display of the slider has been parameterised.					

Object no.	Function	Name	Type	DPT	Flag
340	RNS 1 – Input	KNX status	2 bytes	DPST-22-101	K, S, A
Object via which the KNX-harmonised controller displays elementary basic functions.					

Object no.	Function	Name	Type	DPT	Flag
341	RNS 1 – Input	Ventilation auto / manual feedback	1 bit	DPST-1-1	K, S, A
Object for feedback of the current fan operating mode ("1" = auto; "0" = manual).					

Object no.	Function	Name	Type	DPT	Flag
342	RNS 1 – Input	Fan speed feedback	1 bit	DPST-1-1	K, S, A
Object for additional value-based feedback of the active fan stage. Value meaning: "0" = fan OFF, "1" = stage 1 active, "2" = stage 2 active, "3" = stage 3 active.					

Object no.	Function	Name	Type	DPT	Flag
344	RNS 1 – Output	Switching operating mode	1 byte	DPST-20-102	K, Ü, A
Object with which a room thermostat (controller main unit) can switch between the Comfort, Standby, Night, Frost / heat protection operating modes. When tapping the operating mode icon, this object is transmitted to the bus with the newly selected operating mode after a delay of 2 s.					

Object no.	Function	Name	Type	DPT	Flag
345	RNS 1 – Output	Setpoint adjustment setting	2 bytes	DPST-9-2	K, Ü, A
Object for specifying a basic setpoint adjustment in Kelvin. Object serves as an output for controlling a room thermostat (controller main unit). The value "0" means that adjustment is not active. Values between −670760 K and 670760 K can be specified. This object is only available if the "Type of setpoint adjustment" parameter is set to "Via offset (DPT 9.002)".					

Object no.	Function	Name	Type	DPT	Flag
347	RNS 1 – Output	Ventilation auto / manual setting	1 bit	DPST-1-1	K, Ü, A
Object for specifying the fan operating mode ("1" = auto; "0" = manual). Object serves as an output for controlling a room thermostat (controller main unit) with fan control. When tapping the word "Man." or "Auto" on the device, this object is transmitted to the bus with the corresponding value.					

Object no.	Function	Name	Type	DPT	Flag
348	RNS 1 – Output	Fan speed setting	1 byte	DPST-5-10	K, Ü, A
Object for setting the fan stage. Object serves as an output for controlling a room thermostat (controller main unit) with fan control. Value meaning: "0" = fan OFF, "1" = stage 1 active, "2" = stage 2 active and "3" = stage 3 active.					

14. Information display

The information display is a dedicated display page in the LS Touch, with which information (designation, display value and device) transmitted via the KNX bus system is displayed in list form over 6 lines, e.g. wind strength from the weather station or consumption values from the energy detectors or analogue interface.
The user can open this page via an area page.

Fig. 164: Information display example

14.1 Parameters

Name – line 1	**Free text with max. 28 characters Default: empty**
This text is displayed as an inscription in the left column on the information page for the corresponding line. In addition, the text entered in this parameter is used to identify the area page in the ETS parameter window.	

Display value – line 1	**No display, 1-byte (0 ... 100 %) (DPT 5.001), 1-byte (0 ... 255) (DPT 5.010), 1-byte (-128...127) (DPT 6.010), 1-byte (0 ... 255 %) (DPT 5.004), 1-byte (0 ... 360°) (DPT 5.003), 2-byte (0 ... 65535) (DPT 7.001), 2-byte (-32768...32767) (DPT 8.001), 2-byte temperature (DPT 9.001), 2-byte brightness (DPT 9.004), 4-byte (0 ... 4294967295) (DPT 12.001), 4-byte (-2147483648...2147483647) (DPT 13.001), 4-byte rotational acceleration (DPT 14.001), 14-byte text (DPT 16.001)**
The parameter defines the data point type of the object "Info 1". This selected data type affects the display of the value of the object "Info 1" on the information page. In addition, the display of the unit is fixed for some data point types, meaning these cannot be parameterised in the "Unit" parameter. The following displays are used according to data point type selection: 1-byte (0 ... 100 %): Integer representation with fixed unit in percent. 1-byte (0 ... 255): Integer representation with parameterisable unit. 1-byte (-128 ... +128): Integer representation with parameterisable unit. 1-byte (0 ... 255 %): Integer representation with fixed unit in percent. 1-byte (0 ... 360°): Integer representation with fixed unit in degrees. 2-byte (0 ... 65535): Integer representation with parameterisable unit. 2-byte (-32768 ... 32767): Integer representation with parameterisable unit. 2-byte temperature: decimal representation with one decimal place and fixed unit in °C. 2-byte brightness: Integer representation with one decimal place and fixed unit in lux. 4-byte (0 ... 4294967295): Integer representation with parameterisable unit. 4-byte (-2147483648 ... 2147483648): Integer representation with parameterisable unit. 4-byte rotational acceleration: Decimal representation with one decimal place and with parameterisable unit. 14-byte text: Display as text without unit.	

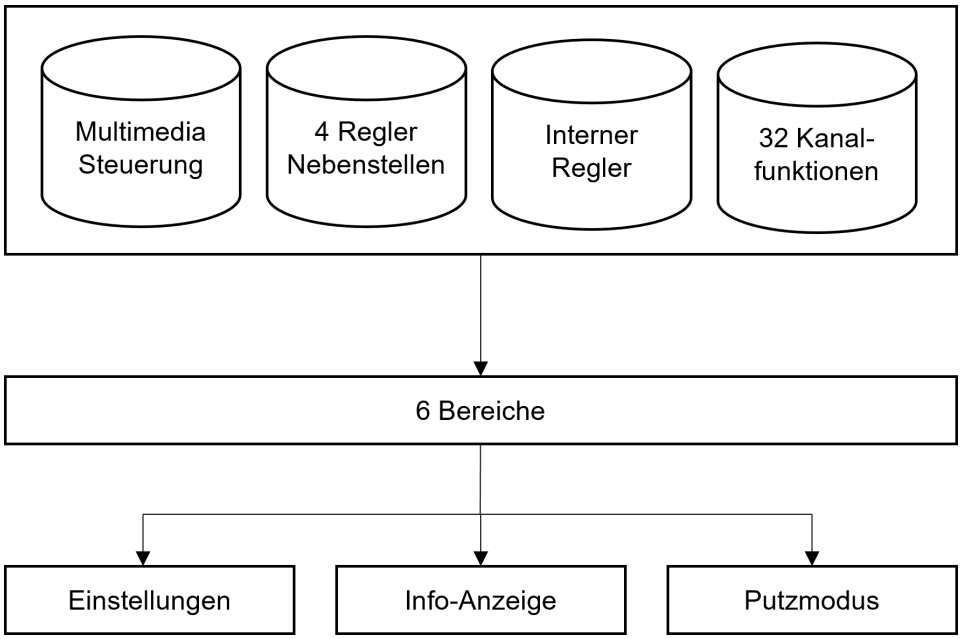
Unit – Line 1	Free text with max. 3 characters Default: empty
The unit for the display value can be specified in the form of 3 characters and is displayed on the device behind the value of the "Info 1" object. The entry of the unit is only possible for data point types for which a parameterisable unit is provided according to the "Display value" parameter. For data point types with a fixed unit, no entry is possible in this field.	

14.2 Objects

Object no.	Function	Name	Type	DPT	Flag
284 to 289	Info Line 1 – Input	Info 1	14 bytes	enDpt1	K, S, A
Object for value display on the information page. The data type depends on the parameterisation in the "Display value" parameter of the corresponding line. The last value received is displayed on the information page. The number of objects that are enabled is limited to the number of parameters of the type "Display value" that are parameterised in the "Info" tab.					

15. Areas

Up to 6 areas with a total of 54 jump targets give the user access to a maximum of 32 channel functions, the internal temperature controller, up to 4 controller extension units, the information display and the multimedia page.



An icon can be displayed for all functions linked in the area, allowing you to choose from a total library of 102 icons:

 Acknowledgement	 Alarm	 Area – Bathroom	 Area – Bedroom
 Area – Cleaning (broom cupboard)	 Area – Dining (dining room)	 Area – Dressing (dressing room)	 Area – Floor – Attic (attic)
 Area – Floor – Basement (basement)	 Area – Floor – First (first floor)	 Area – Floor – Ground (ground floor)	 Area – Floor – Stairs (stairs)
 Area – Freetime (hobby room)	 Area – Garden (garden)	 Area – Kitchen (kitchen)	 Area – Living (living room)

 Area – Office (office)	 Area – Person – Boy (boy)	 Area – Person – Girl (girl)	 Area – Person – Man (man)
 Area – Person – Woman (woman)	 Area – Pool (pool)	 Area – Terrace (terrace)	 Area – Toilet (toilet)
 Area – Wardrobe (cloakroom)	 Blinds – Awning (awning)	 Blinds – Door (blind – door)	 Blinds – Horizontal (blind – horizontal)
 Blinds – Slats (blind – slat)	 Blinds – Vertical (blind – vertical)	 Cleaning (cleaning mode)	 Climate – Building protection (building protection)
 Climate – Comfort (comfort mode)	 Cimate – Frost protection (frost protection)	 Climate – Heat protection (heat protection)	 Climate – Night (night mode)
 Climate – Standby (standby mode)	 Climate – Temp – Celcius (temperature indication)	 Climate – Temp – Outside (outside temperature indication)	 Climate – Temp – Setpoint (temperature setting)
 Climate – Ventilation (fan setting)	 Door communication (Door communication)	 Garage (garage)	 Info (information)
 Lights – Bulb (light bulb)	 Lights – Ceiling (ceiling lamp)	 Lights – Floor – 1 (stand lamp)	 Lights – Floor – 2 (stand lamps)

 Lights – Floor – 3 (floor lamp)	 Lights – LED (LED panel)	 Lights – LED – 1 (LED strips floor)	 Lights – LED – 2 (LED strips ceiling)
 Lights – Mirror (mirror lamp)	 Lights – Orientation (pilot light)	 Lights – Outdoor (outdoor floor lamp)	 Lights – Outdoor – 1 (outdoor lamp)
 Lights – Outdoor – 2 (outdoor lamps)	 Lights – Pendant (pendant)	 Lights – Spot (ceiling spotlight)	 Lights – Stairs (staircase lamp)
 Lights – Stairs – Orient (staircase spotlight)	 Lights – Table (table lamp)	 Lights – Wall (wall lamp)	 Measurements – Limit (limit value)
 Music (music)	 Navigation – Escape (navigation – cancel)	 Navigation – OK (navigation – OK)	 Pause (pause)
 Play (play)	 Playlist (playlist)	 Radio (radio)	 Ramp (volume)
 Scene – Absent (absent)	 Scene – Candle (candle)	 Scene – Christmas (Christmas)	 Scene – Cleaning (cleaning)
 Scene – Coffee (coffee)	 Scene – Cooking (cooking)	 Scene – Day (day)	 Scene – Dinner (dinner)

 Scene – Garden (garden)	 Scene – Movie (movie)	 Scene – Music (music)	 Scene – Night (night)
 Scene – Number (scene number)	 Scene – Party (party)	 Scene – Reading (reading)	 Scene – Relax (relaxing)
 Scene – Sleeping (sleeping)	 Scene – TV (television)	 Scene – Visit (guests)	 Settings (settings)
 Switching – Battery (switching – battery)	 Switching – Circle (switching – circles)	 Switching – Lock (switching – lock)	 Switching – outside (switching – outside)
 Switching – Power (switching – power)	 Switching – Socket (switching – socket)	 Time (time)	 Warning (warning)
 Weather – General (weather)	 Weather – Sun (sunlight)		

15.1 Parameters

15.1.1 General

Number	1 ... 6
The value determines the number of area pages that can be used on the device.	

15.1.2 Area 1 to 6

Inscription	Free text with max. 28 characters Default: empty
The text is displayed as the heading of the area page. In addition, the text entered in this parameter is used to identify the area page in the ETS parameter window. The area pages serve as the second highest level of the menu structure after the menu page.	

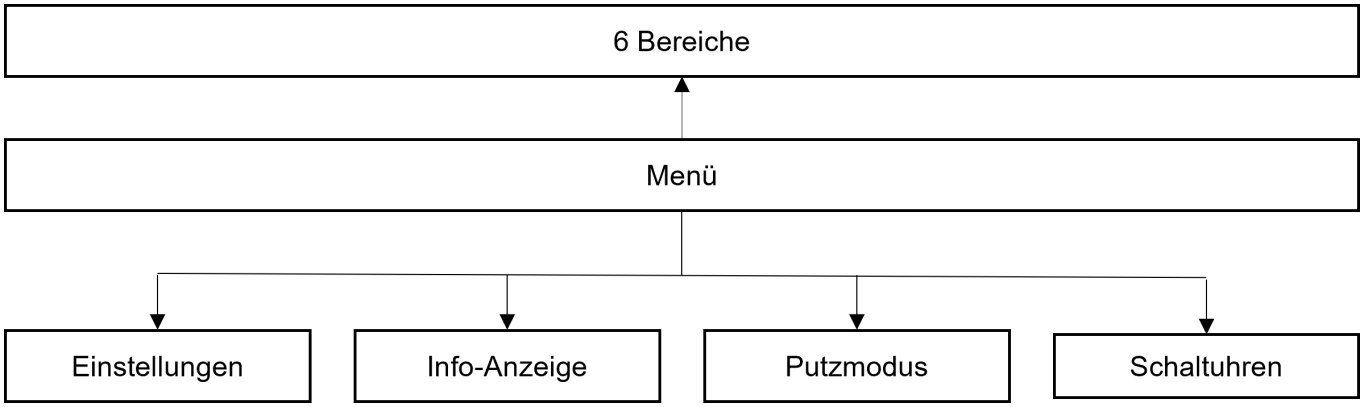
Jump target – Field 1	No assignment, channel 1 ... 32, RTR, RNS 1 ... 4, multimedia, settings, cleaning function, information display
A range page contains up to 9 parameterisable fields. A jump target and an icon can be parameterised for each field. The jump target can be selected in this parameter. The jump target can be either a detail page of a channel, the detail page of the room thermostat, a detail page of a controller extension, the multimedia page or a specialised page for settings, switching times or the cleaning mode. The user accesses the page parameterised here by selecting a field on the device.	

Name – Jump target – Field 1	-
The field displays the name of the reference that is parameterised in the field "Jump target – Field 1". The display is purely informative and cannot be changed directly. It adjusts automatically by selection in the field "Jump target – Field 1".	

Icon – Field 1	No assignment, bathroom, bedroom, broom cupboard, dining room, dressing room, hobby room, garden, kitchen, living room, office, pool, terrace, toilet, cloakroom, ceiling lamp, stand lamp, stand lamps, floor lamp, mirror lamp, outdoor lamp, outdoor floor lamp, pendant, ceiling spotlight, staircase lamp, table lamp, wall lamp, LED strips – floor, LED strip – ceiling, awning, blind – door, blind – horizontal, blind – vertical, weather, sun, temperature indication, outside temperature indication, temperature setting, fan setting, info, time, settings, switch off, music, pause, play, radio, playlist, volume, cleaning mode, comfort mode, absent, candle, Christmas, cleaning, coffee, cooking, day, dinner, garden, film, music, night, scene number, party, reading, relaxing, sleeping, watching TV, guests
The icon selected here is displayed in the corresponding field of the area page.	

16. Menu

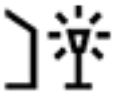
The menu page provides access to the six areas, the cleaning mode, the timer switches and the settings.



An icon can be displayed for all areas linked to the menu, allowing you to choose from the total library of 102 icons:

Acknowledgement	Alarm	Area – Bathroom	Area – Bedroom
Area – Cleaning (broom cupboard)	Area – Dining (dining room)	Area – Dressing (dressing room)	Area – Floor – Attic (attic)
Area – Floor – Basement (basement)	Area – Floor – First (first floor)	Area – Floor – Ground (ground floor)	Area – Floor – Stairs (stairs)
Area – Freetime (hobby room)	Area – Garden (garden)	Area – Kitchen (kitchen)	Area – Living (living room)
Area – Office (office)	Area – Person – Boy (boy)	Area – Person – Girl (girl)	Area – Person – Man (man)

 Area – Person – Woman (woman)	 Area – Pool (pool)	 Area – Terrace (terrace)	 Area – Toilet (toilet)
 Area – Wardrobe (cloakroom)	 Blinds – Awning (awning)	 Blinds – Door (blind – door)	 Blinds – Horizontal (blind – horizontal)
 Blinds – Slats (blind – slat)	 Blinds – Vertical (blind – vertical)	 Cleaning (cleaning mode)	 Climate – Building protection (building protection)
 Climate – Comfort (comfort mode)	 Cimate – Frost protection (frost protection)	 Climate – Heat protection (heat protection)	 Climate – Night (night mode)
 Climate – Standby (standby mode)	 Climate – Temp – Celcius (temperature indication)	 Climate – Temp – Outside (outside temperature indication)	 Climate – Temp – Setpoint (temperature setting)
 Climate – Ventilation (fan setting)	 Door communication (Door communication)	 Garage (garage)	 Info (information)
 Lights – Bulb (light bulb)	 Lights – Ceiling (ceiling lamp)	 Lights – Floor – 1 (stand lamp)	 Lights – Floor – 2 (stand lamps)
 Lights – Floor – 3 (floor lamp)	 Lights – LED (LED panel)	 Lights – LED – 1 (LED strips floor)	 Lights – LED – 2 (LED strips ceiling)

 Lights – Mirror (mirror lamp)	 Lights – Orientation (pilot light)	 Lights – Outdoor (outdoor floor lamp)	 Lights – Outdoor – 1 (outdoor lamp)
 Lights – Outdoor – 2 (outdoor lamps)	 Lights – Pendant (pendant)	 Lights – Spot (ceiling spotlight)	 Lights – Stairs (staircase lamp)
 Lights – Stairs – Orient (staircase spotlight)	 Lights – Table (table lamp)	 Lights – Wall (wall lamp)	 Measurements – Limit (limit value)
 Music (music)	 Navigation – Escape (navigation – cancel)	 Navigation – OK (navigation – OK)	 Pause (pause)
 Play (play)	 Playlist (playlist)	 Radio (radio)	 Ramp (volume)
 Scene – Absent (absent)	 Scene – Candle (candle)	 Scene – Christmas (Christmas)	 Scene – Cleaning (cleaning)
 Scene – Coffee (coffee)	 Scene – Cooking (cooking)	 Scene – Day (day)	 Scene – Dinner (dinner)
 Scene – Garden (garden)	 Scene – Movie (movie)	 Scene – Music (music)	 Scene – Night (night)

 Scene – Number (scene number)	 Scene – Party (party)	 Scene – Reading (reading)	 Scene – Relax (relaxing)
 Scene – Sleeping (sleeping)	 Scene – TV (television)	 Scene – Visit (guests)	 Settings (settings)
 Switching – Battery (switching – battery)	 Switching – Circle (switching – circles)	 Switching – Lock (switching – lock)	 Switching – outside (switching – outside)
 Switching – Power (switching – power)	 Switching – Socket (switching – socket)	 Time (time)	 Warning (warning)
 Weather – General (weather)	 Weather – Sun (sunlight)		

16.1 Parameters

Inscription	**Free text with max. 28 characters** **Default: empty**
The text is displayed as the heading of the menu page. In addition, the text entered in this parameter is used to identify the area page in the ETS parameter window. Each device contains a menu page that serves as the highest level of the menu structure.	

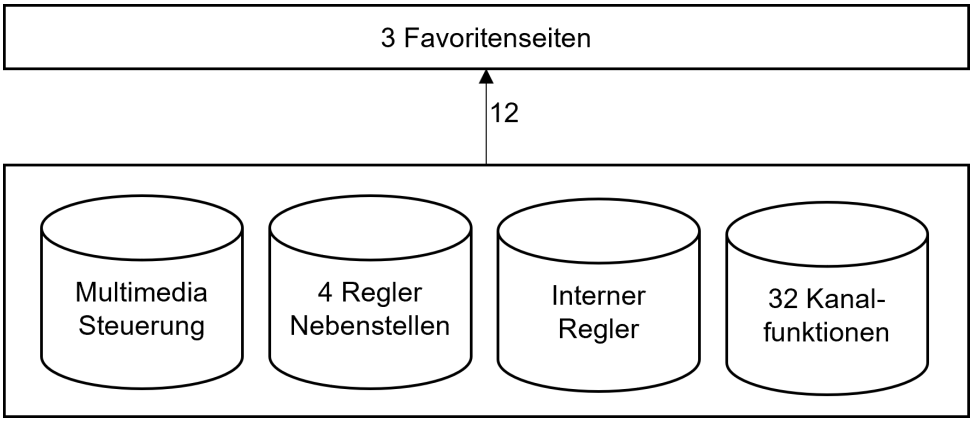
Jump target – Field 1	**No assignment,** **channel 1 ... 32,** **area 1 ... 6,** **RTR,** **RNS 1 ... 4,** **multimedia,** **settings,** **cleaning function,** **information display**
The menu page contains up to 9 parameterisable fields. A jump target and an icon can be parameterised for each field. In this parameter, a reference can be selected as the jump target. This can be either an area page or a specialised page for settings, switching times or the cleaning mode. The user accesses the page parameterised here by selecting a field on the device.	

Name – Jump target – Field 1	**-**
The field displays the name of the reference that is parameterised in the field "Jump target – Field 1". The display is purely informative and cannot be changed directly. It adjusts automatically by selection in the field "Jump target – Field 1".	

Icon – Field 1	**No assignment, bathroom, bedroom, broom cupboard, dining room, dressing room, hobby room, garden, kitchen, living room, office, pool, terrace, toilet, cloakroom, ceiling lamp, stand lamp, stand lamps, floor lamp, mirror lamp, outdoor lamp, outdoor floor lamp, pendant, ceiling spotlight, staircase lamp, table lamp, wall lamp, LED strips – floor, LED strip – ceiling, awning, blind – door, blind – horizontal, blind – vertical, weather, sun, temperature indication, outside temperature indication, temperature setting, fan setting, info, time, settings, switch off, music, pause, play, radio, playlist, volume, cleaning mode, comfort mode, absent, candle, Christmas, cleaning, coffee, cooking, day, dinner, garden, film, music, night, scene number, party, reading, relaxing, sleeping, watching TV, guests**
The icon selected here is displayed in the corresponding field of the menu page.	

17. Favourites

Up to three favourites pages offer the possibility to highlight, group and prioritise up to 12 functions and to use them directly and quickly.



The design of the favourites pages can be set in advance in the ETS application and the user can change this at any time via the settings on the display. Overwriting during the ETS download of the values selected using the touch display can be excluded by parameters.

17.1 Settings on the device

Creating / deleting a favourites page / adjusting the layout

Fig. 165: Settings – Favourites selection

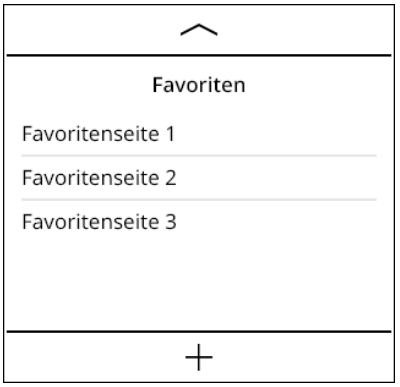


Fig. 166: Adding/selecting a favourites page

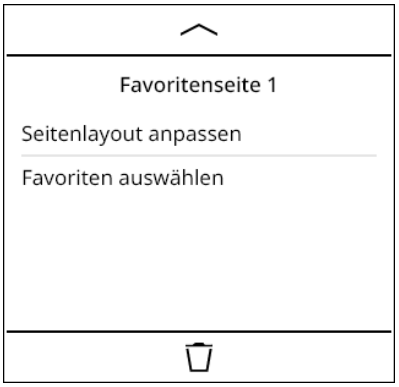


Fig. 167: Adjusting the page layout

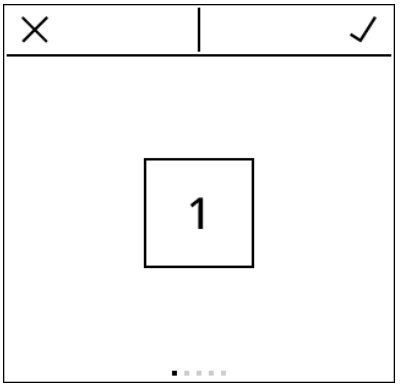


Fig. 168: Display – 1 channel

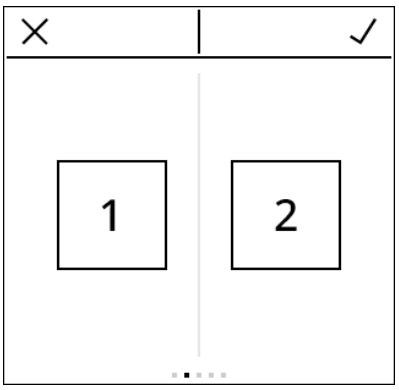


Fig. 169: Display – 2 channels

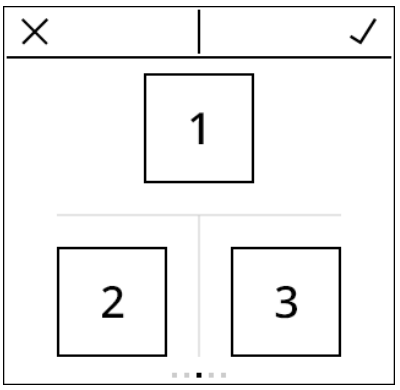


Fig. 170: Display – 3 channels, double operation bottom

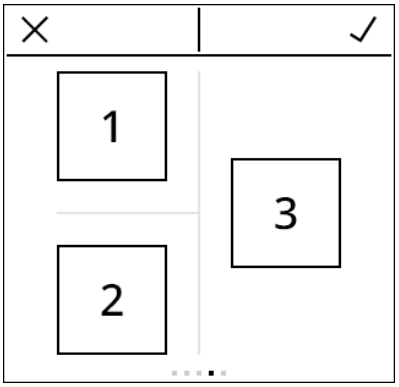


Fig. 171: Display – 3 channels double operation on left

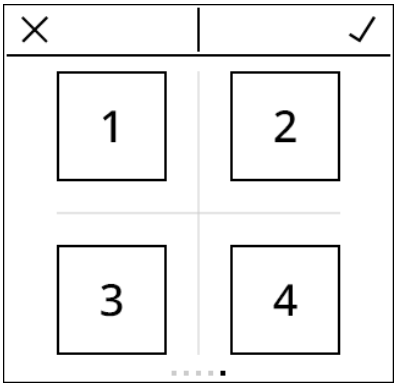


Fig. 172: Display – 4 channels

Selecting favourites

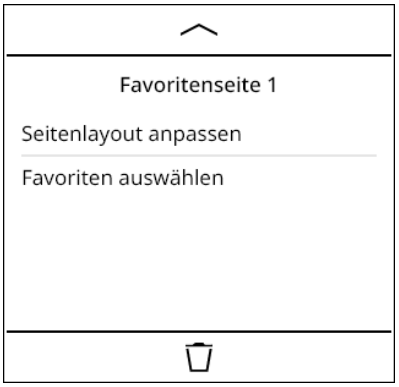


Fig. 173: Selecting favourites

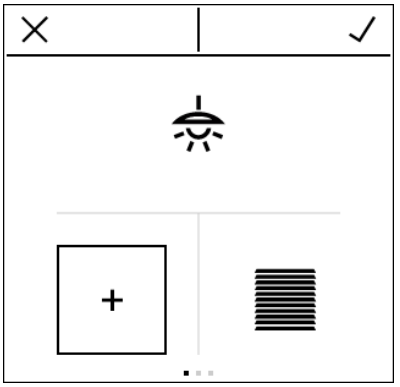


Fig. 174: Selecting a position

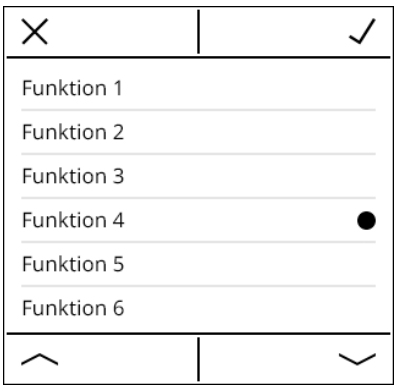


Fig. 175: Selecting a function

18. Parameters

18.1 General

Number	**1 ... 3**
The value determines the number of favourites pages that can be used on the device.	

Overwriting the favourites configuration on the device during ETS programming operation	**Active, inactive**
If this parameter is active, then all configurations for the favourites made by the user on the device are overwritten during an ETS programming operation. This affects the following parameters: number of favourites pages, number of channels per favourites page, channel assignments of all favourites pages.	

18.2 Favourite 1 to 3

Name	**Free text with max. 28 characters** **Default: empty**
The text entered in this parameter is used to identify the favourites page in the ETS parameter window. The text is neither programmed into the device nor displayed on the device.	

Number of channels	**1 channel, 2 channels, 3 channels, double operation bottom, 3 channels, double operation on left, 4 channels**
This parameter determines the number of channel functions to be controlled per favourites page and also the layout of the favourites page.	

Jump target – Field 1	**No assignment, channel 1 ... 32, RTR, RNS 1 ... 4, multimedia**

A favourites page contains up to 4 parameterisable fields. A jump target and an icon can be parameterised for each field. The jump target can be selected in this parameter. The jump target can be either a detail page of a channel, the detail page of the room thermostat, a detail page of a controller extension or the multimedia page.
The user accesses the detail page parameterised here by pressing the favourites page field on the device for a prolonged time.
Short touch operation allows direct actions to be performed on the favourites page, e.g. switching actions. The actions that can be performed depend on the type of reference from the parameter "Jump target – Field 1", as shown in the following:
Switching: When the icon is pressed, the "Switching" object is transmitted, and the value is switched between "ON" and "OFF". If the channel is assigned to two or four favourites fields, then symbols are also visible above and below the icon, which can be pressed to send an "ON" or "OFF" message defined in the object.
Dimming: When the icon is pressed, the "Brightness" object is transmitted, with the value being switched between "0 %" and "100 %". In addition, the "Switching" object is transmitted according to the brightness, with the "OFF" value being transmitted when the brightness changes to 0 % and "ON" being transmitted when the brightness changes to values greater than 0 %.
If the channel is assigned to two or four favourites fields, then symbols are also visible above and below the icon, which can be pressed to transmit the current brightness value of "+1 %" (upper symbol) or "-1 %" (lower symbol) in the "Brightness" object. These fields have a button repeat function, i.e. if the fields remain pressed, they repeat these communication objects. For these actions, the "Switching" object is also transmitted according to the above-mentioned rule, if applicable.
Dimming Tunable White: When the icon is pressed, the "Brightness" object is transmitted, with the value being switched between "0 %" and "100 %". In addition, the "Switching" object is transmitted according to the brightness, with the "OFF" value being transmitted when the brightness changes to 0 % and "ON" being transmitted when the brightness changes to values greater than 0 %.
If the channel is assigned to two or four favourites fields, then symbols are also visible above and below the icon, which can be pressed to transmit the current brightness value of "+1 %" (upper symbol) or "-1 %" (lower symbol) in the "Brightness" object. For these actions, the "Switching" object is also transmitted according to the above-mentioned rule, if applicable. These fields have a button repeat function, i.e. if the fields remain pressed, they repeat these communication objects. The colour temperature object cannot be transmitted via the favourites control. The detail page must be used for this.
Dimming RGB: When the icon is pressed, the brightness is changed, with the value being switched between "0 %" and "100 %". In addition, the "Switching" object is transmitted according to the brightness, with the "OFF" value being transmitted when the brightness changes to 0 % and "ON" being transmitted when the brightness changes to values greater than 0 %.
If the channel is assigned to two or four favourites fields, then symbols are also visible above and below the icon, which can be pressed to transmit the current brightness value of "+1 %" (upper symbol) or "-1 %" (lower symbol). For these actions, the "Switching" object is also transmitted according to the above-mentioned rule, if applicable. These fields have a button repeat function, i.e. if the fields remain pressed, they repeat these communication objects. Each time the brightness is changed, the current RGB value, which is scaled with the current brightness, is transmitted to the bus. This scaling corresponds to the change of the V-value in the HSV representation of the current RGB value.
The colour cannot be changed via the favourites control. The detail page must be used for this.
Shutter / awning / blind: When the icon is pressed, the "Long-term operation" object is transmitted and the value is switched between "UP" and "DOWN". If the channel is assigned to two or four favourites fields, then symbols are also visible above and below the icon, which can be pressed to send the "Short-term operation" object with the value "Increase increment" (upper symbol) or "Decrease increment" (lower symbol). These fields have a button repeat function, i.e. if the fields remain pressed, they repeat these communication objects.
Value transmitter: When the icon is pressed, the "Value transmitter" object is transmitted, whereby the value is switched between the minimum and maximum value parameterised.

If the channel is assigned to two or four favourites fields, then symbols are also visible above and below the icon, which can be pressed to transmit the current value plus the parameterised "increment" (upper symbol) or minus the parameterised "increment" (lower symbol) in the "Value transmitter" object. These fields have a button repeat function, i.e. if the fields remain pressed, they repeat these communication objects.
Scene extension: When the icon is pressed, the "Scene extension" object is transmitted with the parameterised scene number.
Room thermostat: When the icon is pressed, the "KNX status operating mode" object is transmitted, whereby the value is switched cyclically in each case. Switching takes place successively between the values "Comfort", "Standby", "Night mode" and, if applicable, "Frost / heat protection operation" (if activated in the "Control element frost protection symbol" parameter).
Controller extension: When the icon is pressed, the "Switching operating mode" object is transmitted, whereby the value is switched cyclically in each case. Switching takes place successively between the values "Comfort", "Standby", "Night mode" and, if applicable, "Frost / heat protection operation" (if activated in the "Control element frost protection symbol" parameter).
Multimedia: When the icon is pressed, the "Start / stop playback" object is activated and the value is switched in each case.
If the channel is assigned to two or four favourites fields, then symbols are also visible above and below the icon, which can be pressed to transmit the objects "Next title" and "Previous title". When the upper symbol is pressed, "1" is transmitted in the "Next title" object and "0" in the "Previous title" object. When the lower symbol is pressed, "0" is transmitted in the "Next title" object and "1" in the "Previous title" object.

Name – Jump target – Field 1	**-**

The field displays the name of the reference that is parameterised in the field "Jump target – Field 1". The display is purely informative and cannot be changed directly. It adjusts automatically by selection in the field "Jump target – Field 1".

19. Timer switches

The integrated weekly timer is an 8-channel weekly timer with up to 4 switching times, each with selectable Astro or random function. For example, shutters can open or close in a parameterisable time interval depending on the season. Alternatively, this function can be set to random.
Up to eight timer switch channels can each be assigned one of the created channel functions, the internal temperature controller, the controller extensions or the multimedia function via jump targets.

In addition to configuration via the ETS application, the user can create and change timer switch channels and switching times or adjust assigned functions at any time via the touch display.

The user can parameterise whether the settings of the weekly timer made via the touch display are overwritten by the values parameterised by the ETS with the ETS programming procedure.

19.1 Settings on the device

Fig. 176: Creating new switching time

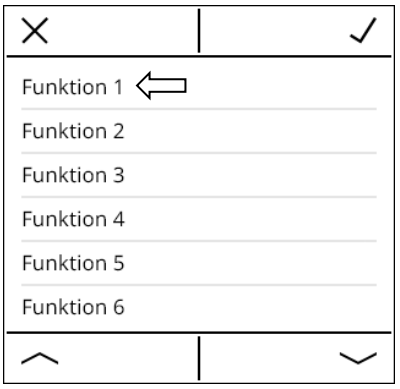


Fig. 177: Selecting a function

Fig. 178: Selecting a switching time

Fig. 179: Switching time overview

Fig. 180: Editing the switching time

Fig. 181: Editing the time

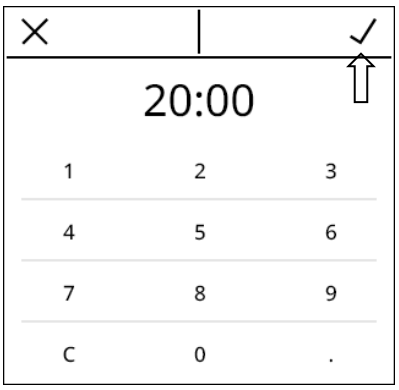


Fig. 182: Confirming the time

Fig. 183: Time and whole week

Fig. 184: Selecting days of the week

Fig. 185: Time without weekend

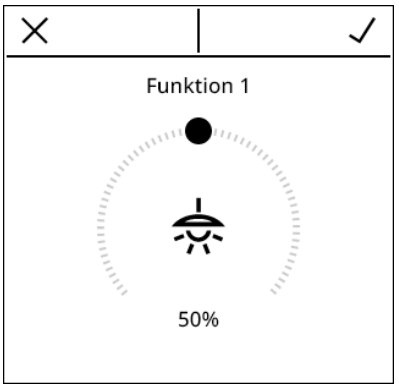


Fig. 186: Adjusting the dimming value

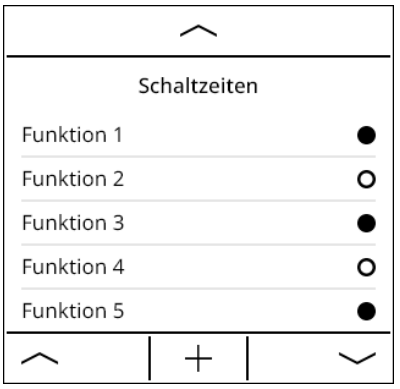


Fig. 187: Activating/deactivating functions

19.2 Parameters

19.2.1 General

Number of timer switches	**0 ... 8**
The value determines the number of timer switches that can be used on the device.	

Timer switch settings on the device during ETS programming operation	**Active, inactive**
If this parameter is active, then all settings for the timer switches made by the user on the device are overwritten during an ETS programming operation. This affects the switching times for the day selection.	

Setting the location	**City selection, coordinates**
To use the astro function for the timer switches, it is necessary to enter the location. This parameter is used to determine whether the location is to be entered by means of coordinates or by selecting a city.	

City selection	**Madrid, 40.2°N, −3.7°E, London, 51.5°N, −0.1°E, Paris, 48.8°N, 2.3°E, Cologne, 50.9°N, 7.0°E, Zurich, 47.4°N, 8.6°E, Milan, 45.5°N, 9.2°E, Hamburg, 53.6°N, 9.9°E, Schalksmühle, 51.2°N, 7.3°E, Munich, 48.1°N, 11.6°E, Rome, 41.9°N, 12.5°E, Berlin, 52.5°N, 13.4°E, Vienna, 48.2°N, 16.4°E**
Selecting a city to show the location. This parameter is only visible if "City selection" is parameterised in "Set the location".	

Longitude – East (negative values correspond to West)	**-180 ... 11.1 ... 180**
Selecting a longitude to show the location. This parameter is only visible if "Coordinates" is parameterised in "Set the location".	

Latitude – North (negative values correspond to South)	**-90 ... 49.7 ... 90**
Selecting a latitude to show the location. This parameter is only visible if "Coordinates" is parameterised in "Set the location".	

Time zone in terms of Coordinated Universal Time (UTC)	**(UTC −12:00) International Date Line West, (UTC −11:00) Samoa, (UTC −10:00) Hawaii, (UTC −09:00) Alaska, (UTC −08:00) Pacific (USA, Canada), (UTC −07:00) Arizona, Denver, Calgary, (UTC −06:00) Chicago, Dallas, Mexico City, (UTC −05:00) New York City, Miami, Atlanta, Detroit, (UTC −04:30) Caracas, (UTC −04:00) Atlantic (Canada), Manaus, Santiago, (UTC −03:30) Newfoundland, (UTC −03:00) Brasilia, Buenos Aires, Greenland, (UTC −02:00) Median Atlantic, (UTC −01:00) Azores, Cape Verde Islands, (UTC) Dublin, Edinburgh, Lisbon, London, (UTC +01:00) Amsterdam, Berlin, Bern, Rome, Vienna, (UTC +02:00) Athens, Istanbul, Kiev, Sofia, Cairo, (UTC +03:00) Baghdad, Moscow, St. Petersburg, (UTC +03:00) Petersburg, (UTC +03:30) Tehran, (UTC +04:00) Abu Dhabi, Port Louis, Tbilisi, (UTC +04:30) Kabul, (UTC +05:00) Islamabad, Karachi, Tashkent, (UTC +05:30) Chennai, Kolkata, Mumbai, New Delhi, (UTC +05:45) Kathmandu, (UTC +06:00) Astana, Dakka, Novosibirsk, (UTC +06:30) Yangon (Rangoon), (UTC +07:00) Bankok, Hanoi, Jakarta, Kasnoyarsk, (UTC +08:00) Singapore, Beijing, Hong Kong, Taipei, (UTC +09:00) Osaka, Sapporo, Tokyo, Seoul, (UTC +09:30) Adelaide, Darwin, (UTC +10:00) Brisbane, Canberra, Melbourne, Sydney**
Selecting the time zone at the location. This parameter is only visible if "Coordinates" is parameterised in "Set the location".	

19.2.2 Timer switch 1 to 8

Name	**0**
The text entered in this parameter is used to identify the timer switch in the ETS parameter window. The text is neither programmed into the device nor displayed on the device.	

Jump target	No assignment, channel 1 … 32, RTR, RNS 1 ... 4, multimedia

A reference to a channel, the room thermostat, a controller extension or to the multimedia page can be selected at this point.
The action triggered by the timer switch at the switching time cannot be parameterised and is fixed according to the type of reference selected here.
The following list shows the predefined actions of the timer switch according to the type of reference:
Channel – Switching: "Switching" object is transmitted. The value transmitted can be configured on the device.
Channel – Dimming: Brightness value" object is transmitted. The value transmitted can be configured on the device.
Channel – Dimming Tunable White: "Brightness value" object is transmitted. The value transmitted can be configured on the device.
Channel – Dimming RGB: "Dimming value RGB" object is transmitted. The transmitted RGB value can be configured indirectly on the device by entering the brightness of the colour value.
Channel – Shutter / awning / blind: "Curtain height" object is transmitted. The value transmitted can be configured on the device.
Channel – Value transmitter: "Value transmitter" object is transmitted. The value transmitted can be configured on the device.
Channel – Scene extension: "Scene extension" object is transmitted. The value transmitted can be configured on the device.
Room thermostat: Activates an operating mode of the room thermostat on the device. The activated value can be configured on the device.
Controller extension: "Switching operating mode" object is transmitted. The value transmitted can be configured on the device.
Multimedia page: "Start / stop playback" object is transmitted. The value transmitted can be configured on the device.

Name – Jump target	-

The field displays the name of the reference that is parameterised in the field "Jump target". The display is purely informative and cannot be changed directly. It adjusts automatically by selection in the "Jump target" parameter.

Switching type	Time, astro sunrise, astro sunset, random

Selection of how the timer switch is to be triggered. Triggering can take place at a fixed time, at sunrise, at sunset or randomly. Triggering always takes place at the second value "0". When triggered, the object is transmitted according to the "Jump target" parameter.
With the parameterisation "Sunrise", "Sunset" or "random", there is also the option of specifying two further conditions for the switching times with the help of the parameters "Not before" and "Not after".

Time	00:00 ... 12:30 ... 23:59

The parameter sets the time in hours and minutes at which the triggering takes place.
This parameter is only visible if "Time" is parameterised for "Switching type".

Not before	**00:00 ... 06:00 ... 23:59**
If "Sunrise" or "Sunset" has been selected in the "Switching type" parameter, the "Not before" and "Not after" parameters can be used to specify a time period in which the timer switch is to be triggered. Triggering outside of this time period is not done. The following cases are to be distinguished: The time of sunrise or sunset is within the time period: The triggering takes place exactly at the time of sunrise or sunset The time of sunrise or sunset is before the time period: The triggering takes place at the beginning of the time period. The time of sunrise or sunset comes after the time period: The triggering takes place at the end of the time period. If "random" has been selected in the "Switching type" parameter, the "Not before" and "Not after" parameters can be used to specify a time period within which triggering is to occur at a random time. Please note: If a time is specified in the "Not before" parameter that describes a later time of day than the time in the "Not after" parameter, then a time period exceeding midnight is inferred that lasts from the "Not before" time to the subsequent "Not after" time. This parameter is only visible if "Sunrise", "Sunset" or "random" is parameterised for "Switching type".	

Not after	**00:00 ... 18:00 ... 23:59**
See "Not before" parameter description. This parameter is only visible if "Sunrise", "Sunset" or "random" is parameterised for "Switching type".	

Day selection	**Mon: active / inactive** **Tue: active / inactive** **Wed: active / inactive** **Thu: active / inactive** **Fri: active / inactive** **Sat: active / inactive** **Sun: active / inactive**
Here you can select the days on which the timer switch is to be triggered at the parameterised time of day.	

20. Warnings

Up to 6 alarm messages or warnings can be created in the ETS application. When activated, an alarm page can be displayed automatically with or without an acoustic signal (pop-up display), or only a warning is recorded (entered) in the message list, which the user can open via the settings on the display. The user can open this page via an area page in the "Settings" page.

20.1 Parameters

20.1.1 General

Number	**1 ... 6**
The value determines the number of warnings that can be used on the device. For each warning, a text can be stored in the parameter "Text for alarm message", which is displayed when the warning is triggered. The triggering of a warning is done via objects, whereby a separate object exists for each warning.	

20.1.2 Warning 1 to 6

Name	**Free text with max. 28 characters** **Default: empty**
The text entered in this parameter is carried over into the name of the objects and is used to identify the warning in the ETS parameter window. The text is neither programmed into the device nor displayed on the device.	

Text for alarm message	**Free text with max. 28 characters** **Default: empty**
This text is displayed in the warning on the device. The text may have max. 28 characters.	

Priority	**Priority 1 (acoustic signal and display), Priority 2 (display only)**
The value determines which action is carried out when a warning is triggered. In the case of Priority 1 warnings, the warning is displayed on the device with the icon from the "Icon" parameter and the text from the "Text for alarm message" parameter. In addition, you can parameterise whether an acoustic alarm sound should be emitted and whether the alarm message should be acknowledged to make operation of the device possible again. For Priority 2 warnings, only a warning symbol is shown in the heading of the display. This symbol is only visible on the menu page, the area pages and the screen saver. By selecting the newly received warning in the list of warnings under "Settings → Warnings", the warning symbol in the heading is hidden again. Regardless of the priority, the warning with time stamp and the text entered under the parameter "Text for alarm message" is displayed in the list that can be called up via "Settings → Warnings". The last 6 warnings that were triggered in the device are entered in this list.	

Icon	No assignment, bathroom, bedroom, broom cupboard, dining room, dressing room, hobby room, garden, kitchen, living room, office, pool, terrace, toilet, cloakroom, ceiling lamp, stand lamp, stand lamps, floor lamp, mirror lamp, outdoor lamp, outdoor floor lamp, pendant, ceiling spotlight, staircase lamp, table lamp, wall lamp, LED strips – floor, LED strip – ceiling, awning, blind – door, blind – horizontal, blind – vertical, weather, sun, temperature indication, outside temperature indication, temperature setting, fan setting, info, time, settings, switch off, music, pause, play, radio, playlist, volume, cleaning mode, comfort mode, absent, candle, Christmas, cleaning, coffee, cooking, day, dinner, garden, film, music, night, scene number, party, reading, relaxing, sleeping, watching TV, guests
The icon selected here is displayed in the corresponding Priority 1 warning message.	

Duration of the display	Permanent (until confirmation), Temporary
Priority 1 warnings are displayed immediately when triggered. Normal operation of the device is only possible again after the warning is closed. In this parameter, you can select whether the warning can only be closed by acknowledging it or whether it is automatically closed after a certain period of time has elapsed. The warning is acknowledged by pressing the back button displayed above the warning. When the warning is closed, the start page is always displayed on the device. This parameter is only visible if "Priority 1" is parameterised for "Priority".	

Duration of the warning display	0min 0s ... 06:00 ... 59min 59s
A time period can be parameterised here for which a Priority 1 warning is displayed on the device. After this time, the warning is automatically closed. However, it can also be closed beforehand by acknowledging the warning. This parameter is only visible if "Temporary" is parameterised for "Duration of display".	

Acoustic signal	Active, inactive
Here, an additional acoustic signal can be activated for Priority 1 warnings. This parameter is only visible if "Priority 1" is parameterised for "Priority".	

Duration of the acoustic signal	0min 0s ... 06:00 ... 59min 59s
Here, the duration for which the acoustic signal is emitted can be parameterised. After acknowledging it or after this time has elapsed, the acoustic signal is switched off again.	

20.2 Objects

Object no.	Function	Name	Type	DPT	Flag
272	Warning 1 – Input	Warning 1	1 bit	DPST-1-5	K, S, A
The object triggers a warning. Since this is an alarm data type, the warning is only triggered when the value 1 (= alarm) is received. There is a separate object for each of the 6 parameterisable warnings. The number of objects that can be enabled is limited to the number of objects parameterised in the "Number" parameter in the "Warnings" tab.					

21. Logic functions

The device contains up to 8 logic functions. With these functions, simple logical operations can be carried out in a KNX installation. By linking input and output objects, logic functions can be interconnected, allowing complex operations to be carried out.

21.1 Enabling logic functions and configuring the number

In order for the logic functions to be used, they must be centrally enabled on the "General" parameter page.

- Activate the "Logic functions" parameter.

The logic functions can be used. The parameter node "Logic functions" becomes available, which contains further parameter pages. The configuration of the logic functions is done in this parameter node.
Logic functions can be enabled step by step so that the number of visible functions and consequently the available parameters and communication objects in the ETS are clear. The number of available logic functions can be defined on the "Logic functions" parameter page.

- Configure the parameter "Number of logic functions" to the desired value.

A corresponding number of logic functions are created based on the selection.

ⓘ The application program deletes existing logic functions from the configuration when the number of available functions is reduced.

Up to two time functions can be set independently for each switching output. The time functions only act on the "Switching" communication objects and delay the received object value depending on the telegram polarity.

ⓘ At the end of a disabling function, the switching state received during the function or the switching state set before the function can be updated. Remaining times of time functions are also monitored if they have not yet completely expired at the time of the disable release.

ⓘ The time delays do not affect the staircase function if it has been enabled.

ⓘ An elapsing time delay is completely aborted by a reset of the actuator (bus voltage failure or ETS programming operation).

21.2 Parameters

21.2.1 General

Number of logic functions	1 ... 8
The value determines the number of logic functions that can be used on the device.	

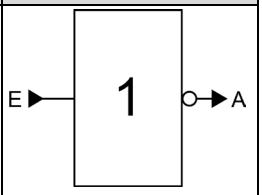
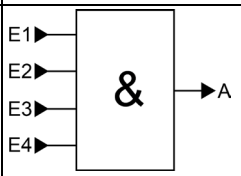
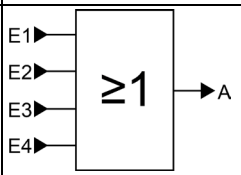
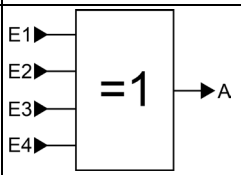
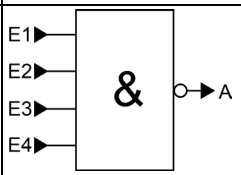
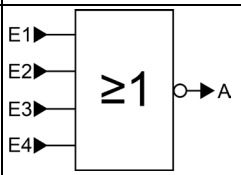
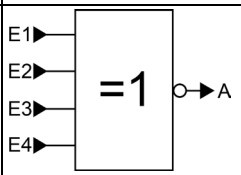
21.2.2 Logic function 1 to 8

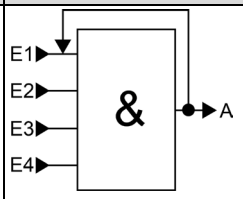
Name	Free text with max. 28 characters Default: empty
The text entered in this parameter is carried over into the name of the objects and is used to identify the logic function in the ETS parameter window. The text is neither programmed into the device nor displayed on the device.	

Type of logic function	Logic gate, converter (1 bit → 1 byte), disabling element (filter / time), comparator, limit switch with hysteresis
For each logic function, it is possible to define which logical operation is to be executed. This parameter is only visible if the logic functions have been enabled on the "General" parameter page. Logic gate: The logic function works as a Boolean logic gate with optionally 1 to 4 inputs and one output. Converter (1 bit → 1 byte): The logic function is configured as a converter. The converter has a 1-bit input and a 1-byte output and also a disabling object. ON / OFF telegrams can be converted to preconfigured values. The disabling object is able to deactivate the converter. Disabling element (filter / time): The logic function is configured as a disabling element. The disabling element has a 1-bit input and a 1-bit output. This logic function can delay input signals depending on their state (ON or OFF) and output them in a filtered form at the output. In addition, a disabling object is available via which the disabling element can be deactivated. Comparator: The logic function works as a comparator with an input whose data format can be parameterised and with a 1-bit output for outputting the comparative operation result. The comparative function as well as the comparative value are configured in the ETS. Limit switch with hysteresis: The logic function acts like a limit switch with hysteresis. An input with configurable data format and a 1-bit output are available. The hysteresis is determined by an upper and lower threshold value. The threshold values are parameterised in the ETS. The input value is compared with the threshold values. The command at the output (ON / OFF) when exceeding and falling below the configured threshold values is configurable.	

21.3 Logic gate

A logic gate has up to 4 Boolean inputs (1-bit) and one logic output (1-bit). Consequently, a logic operation supports only the 1-bit data format. The following table shows configurable logic gates and explains their function.

Logic gate	Description	Icon
Invert (NOT)	The logic gate has only one input. The input is forwarded in inverted form to the gate output.	
And (AND)	The logic gate has 4 inputs. The output is "1" if all inputs are "1". Otherwise, the output is "0".	
Or (OR)	The logic gate has 4 inputs. The output is "0" if all inputs are "0". Otherwise, the output is "1".	
Exclusive Or (XOR)	The logic gate has 4 inputs. The output is "1" if only one input is "1". Otherwise, the output is "0".	
Inverted And (NAND)	The logic gate has 4 inputs. The output is "0" if all inputs are "1". Otherwise, the output is "1".	
Inverted Or (NOR)	The logic gate has 4 inputs. The output is "1" if all inputs are "0". Otherwise, the output is "0".	
Inverted Exclusive Or (NXOR)	The logic gate has 4 inputs. The output is "0" if only one input is "1". Otherwise, the output is "1".	

Logic gate	Description	Icon
And with return (ANDR)	The logic gate has 4 inputs. The output is returned to the first input of the gate. The output is "1" if all inputs are "1". Otherwise, the output is "0". Provided that input 1 is set to "1" and the output is still "0", the return sets input 1 back to "0". Only if inputs 2 to 4 are "1", a newly received "1" at input 1 causes the output to assume the logical state "1". Application: Switching the light manually only in case of twilight Switch at input 1, dawn sensor at input 2 The manual switching signal is ignored as long as the dawn sensor has not yet issued a release. The manual switching signal is only executed at dusk.	

Inputs of a logic gate can be activated or deactivated separately. This allows gates with an individual number of inputs (1 to 4) to be implemented. Optionally, it is possible to invert inputs.
The transmission behaviour of the gate output can be configured.

21.3.1 Logic gate parameter

Logic functions → Logic function...

Logic gate selection	**Invert (NOT)** **And (AND)** **Or (OR)** **Exclusive Or (XOR)** **Inverted And (NAND)** **Inverted Or (NOR)** **Inverted Exclusive Or (NXOR)** **And with return (ANDR)**
This parameter defines the functionality of the logic gate and is only visible with "Type of logic function" = "Logic gate". Invert (NOT): The inverter is configured The gate has one input and one output. The Boolean data value of the input is forwarded in inverted form to the output. And (AND): An And gate is configured. The gate has 1 to 4 inputs and one output. The inputs are logically And-linked. The result is forwarded to the output. Or (OR): An Or gate is configured. The gate has 1 to 4 inputs and one output. The inputs are logically Or-linked. The result is forwarded to the output. Exclusive-Or (XOR): An Exclusive Or gate is configured. The gate has 1 to 4 inputs and one output. The inputs are logically Exclusive Or-linked. The result is forwarded to the output. Inverted And (NAND): An inverted And gate has been configured. The gate has 1 to 4 inputs and one output. The inputs are logically And-linked. The result is forwarded in inverted form to the output. Inverted Or (NOR): An inverted Or gate has been configured. The gate has 1 to 4 inputs and one output. The inputs are logically Or-linked. The result is forwarded in inverted form to the output. Inverted Exclusive Or (NXOR): An inverted Exclusive Or gate is configured. The gate has 1 to 4 inputs and one output. The inputs are logically Exclusive Or-linked. The result is forwarded in inverted form to the output. And with return (ANDR): An AND gate with return is configured. The gate has 1 to 4 inputs and one output. The output is returned to the first input of the gate.	

Input 1	deactivated Input object
Inputs of a logic gate can be activated or deactivated separately. This allows gates with an individual number of inputs (1 to 4) to be implemented. This parameter determines whether the first input of the gate is to be used. This parameter is only visible with "Type of logic function" = "Logic gate".	

Input 2	deactivated Input object
Inputs of a logic gate can be activated or deactivated separately. This allows gates with an individual number of inputs (1 to 4) to be implemented. This parameter determines whether the second input of the gate is to be used. This parameter is only visible with "Type of logic function" = "Logic gate".	

Input 3	deactivated Input object
Inputs of a logic gate can be activated or deactivated separately. This allows gates with an individual number of inputs (1 to 4) to be implemented. This parameter determines whether the third input of the gate is to be used. This parameter is only visible with "Type of logic function" = "Logic gate".	

Input 4	deactivated Input object
Inputs of a logic gate can be activated or deactivated separately. This allows gates with an individual number of inputs (1 to 4) to be implemented. This parameter determines whether the fourth input of the gate is to be used. This parameter is only visible with "Type of logic function" = "Logic gate".	

Inverting input	Checkbox (yes / no)
Optionally, it is possible to invert inputs of the logic gate. This parameter is available for each input of the gate and determines whether the respective input is to be evaluated unchanged or inverted. This parameter is only visible with "Type of logic function" = "Logic gate".	

Transmission criterion	Always send when updating the input Only send when the output changes Send cyclically
The transmission behaviour of the output can be configured at this point. Always send when input is updated: The output transmits the current object value to the KNX with every telegram received at the input. Only send when the output changes: The output transmits the current object value only if the object value has changed compared to the last transmission. With the first telegram to an input after bus voltage return or after an ETS programming operation, the output always transmits the object value. Send cyclically: With this setting, the output cyclically transmits the current object value to the KNX. Cyclical sending is only started after bus voltage return or after an ETS programming operation once the first telegram has been received at the input. The output also transmits the object value as soon as a new telegram is received at the input. The cycle time for cyclical transmission is then restarted!	

Delay for sending the result in hours (0 ... 99)	0 ... 99
Optionally, a delay for sending the result (telegram at the output) can be configured. For "Always send when input is updated": Telegrams at the output are only transmitted when the delay has expired. The delay time is retriggered by each telegram at the input. For "Only send when output changes": Telegrams are only transmitted when the object value at the output changes after the delay has expired. If the logic function is processed again by a new telegram at the input within the delay time and the object value changes as a result, the delay starts again. If the object value of the output does not change due to new input telegrams, the delay does not start again. This parameter defines the hours of the delay time.	

Minutes (0 ... 59)	0 ... 59
This parameter defines the minutes of the delay time.	

Seconds (0 ... 59)	0 ... 59
This parameter defines the seconds of the delay time. The parameters for the transmission delay are only visible with "Transmission criterion" = "Always send when the input is updated" and "Only send when the output changes".	

Cycle time in hours (0 ... 99)	0 ... 99
This parameter defines the cycle time when transmitting the output cyclically. Setting the hours of the cycle time.	

Minutes (0 ... 59)	0 ... 5...59
This parameter defines the minutes of the cycle time.	

Seconds (0 ... 59)	0 ... 59
This parameter defines the seconds of the cycle time. The parameters for the cycle time are only visible with "Transmission criterion" = "Send cyclically".	

21.3.2 Logic gate object list

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Logic gate ... Input 1	Logic ... – Input	1 bit	1,002	K, (L), S, -, A
1-bit object as input 1 of a logic gate (1 to 8). The input state can optionally be inverted. This object is only available if the type of logic function is configured to "Logic gate" and input 1 is used.					

Object no.	Function	Name	Type	DPT	Flag
297, 302, 307, 312, 317, 322, 327, 332	Logic gate ... Input 2	Logic ... – Input	1 bit	1,002	K, (L), S, -, A
1-bit object as input 2 of a logic gate (1 to 8). The input state can optionally be inverted. This object is only available if the type of logic function is configured to "Logic gate" and input 2 is used.					

Object no.	Function	Name	Type	DPT	Flag
298, 303, 308, 313, 318, 323, 328, 333	Logic gate ... Input 3	Logic ... – Input	1 bit	1,002	K, (L), S, -, A
1-bit object as input 3 of a logic gate (1 to 8). The input state can optionally be inverted. This object is only available if the type of logic function is configured to "Logic gate" and input 3 is used.					

Object no.	Function	Name	Type	DPT	Flag
299, 304, 309, 314, 319, 324, 329, 334	Logic gate ... Input 4	Logic ... – Input	1 bit	1,002	K, (L), S, -, A
1-bit object as input 4 of a logic gate (1 to 8). The input state can optionally be inverted. This object is only available if the type of logic function is configured to "Logic gate" and input 4 is used.					

Object no.	Function	Name	Type	DPT	Flag
300, 305, 310, 315, 320, 325, 330, 335	Logic gate output	Logic ... – Input	1 bit	1,002	K, (L), -, Ü, A
1-bit object as output of a logic gate (1 to 8). This object is only available if the type of logic function is configured to "Logic gate" .					

21.4 Converter (1 bit → 1 byte)

The converter has a 1-bit input and a 1-byte output and also a disabling object. ON / OFF telegrams can be converted to preconfigured values. The disabling object is able to deactivate the converter.

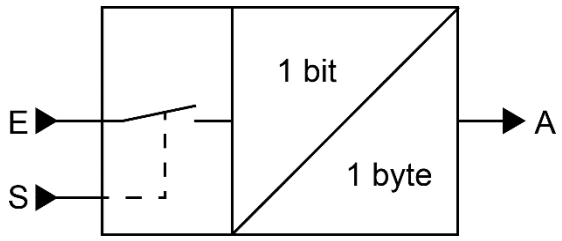


Fig. 188: Converter (1 bit → 1 byte)

The converter can react differently to input states. The parameter "Reaction at the input to" defines whether the converter reacts to ON and OFF commands, or alternatively only processes either ON or OFF telegrams.
Each 1-bit input state can be assigned a specific 1-byte output value. The two output values can be parameterised as desired in the range 0 ... 255. The data format of the output object of the converter is set to DPT 5.001 (0 ... 100 %).
The converter can be deactivated via the disabling object. A deactivated converter no longer processes input states and consequently does not convert any new output values (the last value is retained and may be transmitted repeatedly in cycles). At the end of a disabling function, the converter is released again.
The converter then waits at the input for the next telegram. The telegram polarity of the disabling object can be parameterised.
The transmission behaviour of the converter output can be configured.

21.4.1 Converter parameters (1 Bit → 1 Byte)

Logic functions → Logic function...

Reaction at the input to	**ON and OFF telegrams** **ON telegrams** **OFF telegrams**
The converter can react differently to input states. At this point you define whether the converter reacts to ON and OFF commands or alternatively only processes ON or OFF telegrams.	

Disabling object polarity	**0 = enabled / 1 = disabled** **0 = disabled / 1 = enabled**
This parameter defines the polarity of the disabling object.	

Output value for ON (0 ... 255)	**0 ... 255**
Each 1-bit input state can be assigned a specific 1-byte output value. This parameter defines the output value for ON telegrams. This parameter is only visible if the input is to react to ON telegrams.	

Output value for OFF (0 ... 255)	**0 ... 255**
Each 1-bit input state can be assigned a specific 1-byte output value. This parameter defines the output value for OFF telegrams. This parameter is only visible if the input is to react to OFF telegrams.	

Transmission criterion	**Always send when updating the input** **Only send when the output changes** **Send cyclically**
The transmission behaviour of the output can be configured at this point. Always send when input is updated: The output transmits the current object value to the KNX with every telegram received at the input. Only send when the output changes: The output transmits the current object value only if the object value has changed compared to the last transmission. With the first telegram to an input after bus voltage return or after an ETS programming operation, the output always transmits the object value. Send cyclically: With this setting, the output cyclically transmits the current object value to the KNX. Cyclical sending is only started after bus voltage return or after an ETS programming operation once the first telegram has been received at the input. The output also transmits the object value as soon as a new telegram is received at the input. The cycle time for cyclical transmission is then restarted!	

Delay for sending the result in hours (0 ... 99)	**0 ... 99**
Optionally, a delay for sending the result (telegram at the output) can be configured. For "Always send when input is updated": Telegrams at the output are only transmitted when the delay has expired. The delay time is retriggered by each telegram at the input. For "Only send when output changes": Telegrams are only transmitted when the object value at the output changes after the delay has expired. If the logic function is processed again by a new telegram at the input within the delay time and the object value changes as a result, the delay starts again. If the object value of the output does not change due to new input telegrams, the delay does not start again. This parameter defines the hours of the delay time.	

Minutes (0 ... 59)	**0 ... 59**
This parameter defines the minutes of the delay time.	

Seconds (0 ... 59)	0 ... 59
This parameter defines the seconds of the delay time. The parameters for the transmission delay are only visible with "Transmission criterion" = "Always send when the input is updated" and "Only send when the output changes".	

Cycle time in hours (0 ... 99)	0 ... 99
This parameter defines the cycle time when transmitting the output cyclically. Setting the hours of the cycle time.	

Minutes (0 ... 59)	0 ... 5...59
This parameter defines the minutes of the cycle time.	

Seconds (0 ... 59)	0 ... 59
This parameter defines the seconds of the cycle time. The parameters for the cycle time are only visible with "Transmission criterion" = "Send cyclically".	

21.4.2 Converter object list

Object no.	Function	Name	Type	DPT	Flag
297, 302, 307, 312, 317, 322, 327, 332	Converter input	Logic ... – Input	1 bit	1,002	K, (L), S, -, A
1-bit object as input of a converter. You can parameterise whether the converter reacts to ON and OFF commands or alternatively only processes ON or OFF telegrams. This object is only available if the type of logic function is configured to "Converter".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Converter disabling function	Logic ... – Input	1 bit	1,002	K, (L), S, -, A
1-bit object as disabling input of a converter. A disabled converter no longer processes input states and consequently does not convert any new output values (the last value is retained and may be transmitted repeatedly in cycles). The telegram polarity can be parameterised. This object is only available if the type of logic function is configured to "Converter".					

Object no.	Function	Name	Type	DPT	Flag
300, 305, 310, 315, 320, 325, 330, 335	Converter output	Logic ... – Output	1 byte	5,001	K, (L), -, Ü, A
1-byte object as value output of a converter. This object is only available if the type of logic function is configured to "Converter".					

21.5 Disabling element (filter / time)

The disabling element has a 1-bit input and a 1-bit output and also a disabling object. Input states (ON / OFF) can be independently delayed and filtered before issuing at the output. The filter makes it possible to invert the states of the output (e.g. ON → OFF) or to suppress them completely (e.g. OFF → ---, OFF is not sent). If the filter is not used, the disabling element works only with the time functions if required. Alternatively, it is possible to use only the filter (without delays).
The disabling object is able to deactivate the disabling element.

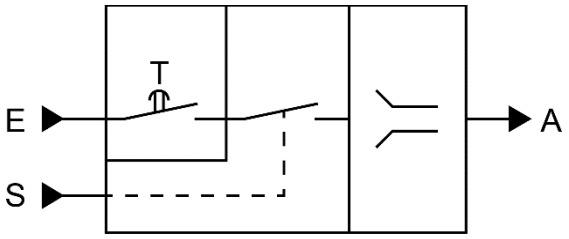


Fig. 189: Disabling element (filter / time)

The "Time function" parameter defines whether ON or OFF telegrams or both states are evaluated with a delay after receipt at the input. If a delay is provided, the delay time can be parameterised separately for ON and OFF telegrams. A delay is only effective if the delay time is set higher than "0". Each telegram received at the input restarts the respective delay time.
If no delay is configured, the input telegrams are transferred directly to the filter.

ⓘ Special function when using delays: If no telegram is received at the input, a parameterised delay time (time > 0) acts as automatic cyclical triggering of the filter. The last input state received in each case is then automatically and repeatedly forwarded to the filter after the delay has elapsed. This then works according to its configuration and forwards the result to the output of the disabling element. Consequently, the output also transmits telegrams depending on the transmission criterion set. If cyclical transmission of the output is not desired due to the automatic triggering of the filter, the transmission criterion should be set to "Only send when the output changes".

Unless a delay is provided, the filter is only triggered via the received telegrams and thus not automatically.

ⓘ After bus voltage return or after an ETS programming operation, the delays are triggered automatically.

The filter is set by the "Filter function" parameter according to the following table.

Filter function	Result
ON → ON / OFF → OFF	Input telegrams are forwarded unchanged to the output. Filter deactivated.
ON → --- / OFF → OFF	ON telegrams are filtered and not forwarded to the output. OFF telegrams are forwarded unchanged to the output.
ON → ON / OFF → ---	OFF telegrams are filtered and not forwarded to the output. ON telegrams are forwarded unchanged to the output.
ON → OFF / OFF → ON	ON telegrams are converted to OFF telegrams and OFF telegrams to ON telegrams and forwarded to the output.
ON → --- / OFF → ON	ON telegrams are filtered and not forwarded to the output. OFF telegrams are converted to ON telegrams and forwarded to the output.
ON → OFF / OFF → ---	OFF telegrams are filtered and not forwarded to the output. ON telegrams are converted to OFF telegrams and forwarded to the output.

The disabling object can be used to deactivate the disabling element. A deactivated disabling element no longer passes on any input states to the filter and consequently does not convert any new output values (the last value is retained and may be transmitted repeatedly in cycles). However, the input states are still evaluated (also with effective delays). At the end of a disabling function, the disabling element is released again. The disabling element then waits at the input for the next telegram or for the next elapsing of the configured delay times.
The telegram polarity of the disabling object can be parameterised.
The transmission behaviour of the disabling element output can be configured.

21.5.1 Disabling element parameter

Logic functions → Logic function...

Time function	**No delay** **Delay ON telegrams only Delay OFF telegrams only** **only delay OFF telegrams** **Delay ON and OFF telegrams**
This parameter defines whether ON or OFF telegrams or both states are evaluated with a delay after receipt at the input. If a delay is provided, the delay time can be parameterised separately for ON and OFF telegrams. If no delay is configured, the input telegrams are transferred directly to the filter.	

Delay for ON telegrams **Minutes (0 ... 59)**	**0 ... 59**
This is where the delay for ON telegrams is configured. A delay is only effective if the delay time is set higher than "0". Each ON telegram received at the input restarts the delay time. Special function when using delays: If no telegram is received at the input, a parameterised delay time (time > 0) acts as automatic cyclical triggering of the filter. The last input state received in each case is then automatically and repeatedly forwarded to the filter after the delay has elapsed. This then works according to its configuration and forwards the result to the output of the disabling element. Consequently, the output also transmits telegrams depending on the transmission criterion set. If cyclical transmission of the output is not desired due to the automatic triggering of the filter, the transmission criterion should be set to "Only send when the output changes". After bus voltage return or after an ETS programming operation, the delays are triggered automatically. Setting of the minutes of the ON delay time.	

Seconds (0 ... 59)	**0 ... 10 ... 59**
Setting of the seconds of the ON delay time. The ON delay parameters are only available if the "Time function" parameter is set to "Delay ON telegrams only" or "Delay ON and OFF telegrams".	

Delay for OFF telegrams **Minutes (0 ... 59)**	**0 ... 59**
This is where the delay for OFF telegrams is configured. A delay is only effective if the delay time is set higher than "0". Each OFF telegram received at the input restarts the delay time. Special function when using delays: If no telegram is received at the input, a parameterised delay time (time > 0) acts as automatic cyclical triggering of the filter. The last input state received in each case is then automatically and repeatedly forwarded to the filter after the delay has elapsed. This then works according to its configuration and forwards the result to the output of the disabling element. Consequently, the output also transmits telegrams depending on the transmission criterion set. If cyclical transmission of the output is not desired due to the automatic triggering of the filter, the transmission criterion should be set to "Only send when the output changes". After bus voltage return or after an ETS programming operation, the delays are triggered automatically. Setting of the minutes of the OFF delay time.	

Seconds (0 ... 59)	**0 ... 10 ... 59**
Setting of the seconds of the OFF delay time. The OFF delay parameters are only available if the "Time function" parameter is set to "Delay OFF telegrams only" or "Delay ON and OFF telegrams".	

Disabling object polarity	**0 = enabled / 1 = disabled** **0 = disabled / 1 = enabled**
This parameter defines the polarity of the disabling object.	

Filter function	**ON → ON / OFF → OFF** **ON → --- / OFF → OFF** **ON → ON / OFF → --- ON** **ON → OFF / OFF → ON** **ON → --- / OFF → ON** **ON → OFF / OFF → ---**
This parameter defines the functioning of the filter. ON → ON / OFF → OFF: Input telegrams are forwarded unchanged to the output. Filter deactivated. ON → --- / OFF → OFF: ON telegrams are filtered and not forwarded to the output. OFF telegrams are forwarded unchanged to the output. ON → ON / OFF → ---: OFF telegrams are filtered and not forwarded to the output. ON telegrams are forwarded unchanged to the output. ON → OFF / OFF → ON: ON telegrams are converted to OFF telegrams and OFF telegrams to ON telegrams and forwarded to the output. ON → --- / OFF → ON: ON telegrams are filtered and not forwarded to the output. OFF telegrams are converted to ON telegrams and forwarded to the output. ON → OFF / OFF → ---: OFF telegrams are filtered and not forwarded to the output. ON telegrams are converted to OFF telegrams and forwarded to the output.	

Transmission criterion	**Always send when updating the input** **Only send when the output changes** **Send cyclically**
The transmission behaviour of the output can be configured at this point. Always send when input is updated: The output transmits the current object value to the KNX with every telegram received at the input. In addition, transmission at the output is repeated if no telegram was received at the input when using the delay times and the configured time has elapsed. Only send when the output changes: The output transmits the current object value only if the object value has changed compared to the last transmission. After bus voltage return or an ETS programming operation, the output always transmits the object value. Send cyclically: With this setting, the output cyclically transmits the current object value to the KNX. Cyclical sending is only started after bus voltage return or after an ETS programming operation once the first telegram has been received at the input. When using the ON/OFF delay, after bus voltage return or after an ETS programming operation, cyclical transmission starts automatically after the delay time has elapsed. The output also transmits the object value as soon as a new telegram is received at the input. The cycle time for cyclical transmission is then restarted!	

Cycle time in hours (0 ... 99)	**0 ... 99**
This parameter defines the cycle time when transmitting the output cyclically. Setting the hours of the cycle time.	

Minutes (0 ... 59)	0 ... 5...59
This parameter defines the minutes of the cycle time.	

Seconds (0 ... 59)	0 ... 59
This parameter defines the seconds of the cycle time. The parameters for the cycle time are only visible with "Transmission criterion" = "Send cyclically".	

21.5.2 Disabling element object list

Object no.	Function	Name	Type	DPT	Flag
297, 302, 307, 312, 317, 322, 327, 332	Disabling element input	Logic ... – Input	1 bit	1,002	K, (L), S, -, A
1-bit object as input of a disabling element. This object is only available if the type of logic function is configured to "Disabling element".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Disabling function disabling element	Logic ... – Input	1 bit	1,002	K, (L), S, -, A
1-bit object as disabling input of a disabling element. A deactivated disabling element no longer passes on any input states to the filter and consequently does not convert any new output values (the last value is retained and may be transmitted repeatedly in cycles). The telegram polarity can be parameterised. This object is only available if the type of logic function is configured to "Disabling element".					

Object no.	Function	Name	Type	DPT	Flag
300, 305, 310, 315, 320, 325, 330, 335	Disabling element output	Logic ... – Output	1 bit	1,002	K, (L), -, Ü, A
1-bit object as output of a disabling element. This object is only available if the type of logic function is configured to "Disabling element".					

21.6 Comparator

The comparator works with an input whose data format can be parameterised and with a 1-bit output for outputting the comparative operation result. The comparator compares the value received at the input with a configured comparative value and evaluates according to the specified comparative function whether the comparison applies (result = true) or does not apply (result = false).
The comparative function as well as the comparative value are configured in the ETS.

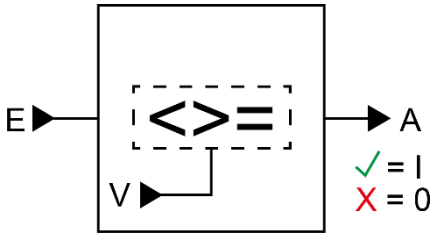


Fig. 190: Comparator

The "Data format" parameter defines the size and formatting of the input object according to the following table. The output object is fixed at 1-bit (DPT 1.002) and outputs the result of the comparative operation (ON = true / OFF = false). The comparative value that can be set in the ETS adapts to the input data format.

Data format	KNX DPT
4-bit dimming	3,007
1-byte switching operating mode	20,102
1-byte scene extension	18,001
1-byte value 0 ... 255	5,010
1-byte brightness value 0 ... 100 %	5,001
2-byte value 0 ... 655535	7,001
2-byte value −32768...32767	8,001
2-byte floating point number	9.0xx
4-byte value −2147483648...2147483647	13,001

The following table shows the possible comparative functions (E = input value, V = comparative value).

Comparative function	Functionality
Equal (E = V1)	The output of the comparator is "ON" (true) if the input is equal to the comparative value. Otherwise, the output is "OFF" (false).
Unequal (E ≠ V1)	The output of the comparator is "ON" (true) if the input is not equal to the comparative value. If the input value is equal to the comparative value, the output is "OFF" (false).
Greater than (E > V1)	The output of the comparator is "ON" (true) if the input is greater than the comparative value. Provided the input value is less than or equal to the comparison value, the output switches to "OFF" (false).
Greater than or equal to (E ≥ V1)	The output of the comparator is "ON" (true) if the input is greater than or equal to the comparative value. If the input value is smaller than the comparative value, the output switches to "OFF" (false).
Less than (E < V1)	The output of the comparator is "ON" (true) if the input is less than the comparative value. Provided the input value is greater than or equal to the comparative value, the output switches to "OFF" (false).
Less than (E ≤ V1)	The output of the comparator is "ON" (true) if the input is less than or equal to the comparative value. Provided the input value is greater than the comparative value, the output switches to "OFF" (false).

Comparative function	Functionality
Area check less than (V1 < E < V2)	There are two comparative values. The output of the comparator is "ON" (true) if the input is greater than the first comparative value and less than the second comparative value. Provided the input value is smaller than the first comparative value or equal to the first comparative value or larger than the second comparative value or equal to the second comparative value, the output switches to "OFF" (false).
Area check less than or equal to (V1 ≤ E ≤ V2)	There are two comparative values. The output of the comparator is "ON" (true) if the input is greater than or equal to the first comparative value and less than or equal to the second comparative value. Provided that the input value is smaller than the first comparative value or larger than the second comparative value, the output switches to "OFF" (false).

The transmission behaviour of the comparator output can be configured.

21.6.1 Comparator parameter

Logic functions → Logic function...

Data format	**4-bit dimming (DPT 3.007)** **1-byte operating mode switching (DPT 20.102)** **1-byte scene extension (DPT 18.001)** **1-byte value 0 ... 255 (DPT 5.010)** **1-byte brightness value 0 ... 100 % (DPT 5.001)** **2-byte value 0 ... 655535 (DPT 7.001)** **2-byte value -32768...32767 (DPT 8.001)** **2-byte floating point number (DPT 9.0xx)** **4-byte value -2147483648...2147483647 (DPT 13.001)**
This parameter defines the size and formatting of the input object. The output object is fixed at 1-bit (DPT 1.002) and outputs the result of the comparative operation (ON = true / OFF = false).	

Comparative function	**Equal to (E = V)** **Unequal to (E ≠ V)** **Greater than (E > V)** **Greater than or equal to (E ≥ V)** **Less than (E < V)** **Less than or equal to (E ≤ V)** **Area check less than (V1 < E < V2)** **Area check less than or equal to (V1 ≤ E ≤ V2)**

The comparator compares the value (E) received at the input with a configured comparative value (V) and evaluates according to the comparative function specified at this point whether the comparison applies (result = true) or does not apply (result = false).

- Equal (E = V): The output of the comparator is "ON" (true) if the input is equal to the comparative value. Otherwise, the output is "OFF" (false).
- Unequal (E ≠ V): The output of the comparator is "ON" (true) if the input is unequal to the comparative value. If the input value is equal to the comparative value, the output is "OFF" (false).
- Greater than (E > V): The output of the comparator is "ON" (true) if the input is greater than the comparative value. Provided the input value is less than or equal to the comparison value, the output switches to "OFF" (false).
- Greater than or equal to (E ≥ V): The output of the comparator is "ON" (true) if the input is greater than or equal to the comparative value. If the input value is smaller than the comparative value, the output switches to "OFF" (false).
- Less than (E < V): The output of the comparator is "ON" (true) if the input is smaller than the comparative value. Provided the input value is greater than or equal to the comparative value, the output switches to "OFF" (false).
- Less than or equal to (E ≤ V): The output of the comparator is "ON" (true) if the input is less than or equal to the comparative value. Provided the input value is greater than the comparative value, the output switches to "OFF" (false).
- Area check less than (V1 < E < V2): There are two comparative values. The output of the comparator is "ON" (true) if the input is greater than the first comparative value and less than the second comparative value. Provided the input value is smaller than the first comparative value or equal to the first comparative value or larger than the second comparative value or equal to the second comparative value, the output switches to "OFF" (false).
- Area check less than or equal to (V1 ≤ E ≤ V2): There are two comparative values. The output of the comparator is "ON" (true) if the input is greater than or equal to the first comparative value and less than or equal to the second comparative value. Provided that the input value is smaller than the first comparative value or larger than the second comparative value, the output switches to "OFF" (false).

Comparative value (V)	**Dim darker, stop (0)** **Dim darker, 100 % (1)** **Dim darker, 50 % (2)** **Dim darker, 25 % (3)** **Dim darker, 12.5 % (4)** **Dim darker, 6% (5)** **Dim darker, 3 % (6)** **Dim darker, 1.5 % (7)** **Dim brighter, stop (8)** **Dim brighter, 100 % (9)** **Dim brighter, 50 % (10)** **Dim brighter, 25 % (11)** **Dim brighter, 12.5 % (12)** **Dim brighter, 6% (13)** **Dim brighter, 3 % (14)** **Dim brighter, 1.5 % (15)**
This parameter defines the internal comparative value (V) for the comparative function. This parameter is only available if the "Data format" is set to "4-bit dimming (DPT 3.007)".	

Comparative value (V)	**Automatic (0)** **Comfort mode (1)** **Standby mode (2)** **Night mode (3)** **Frost/heat protection (4)**
This parameter defines the internal comparative value (V) for the comparative function. This parameter is only available if the "Data format" is set to "1-byte switching operating mode (DPT 20.102)".	

Comparative value (V)	**Call up scene 1 (0)** **Call up scene 2 (1)** **...** **Call up scene 64 (63)** **Save scene 1 (128)** **Save scene 2 (129)** **...** **Save scene 64 (191)**
This parameter defines the internal comparative value (V) for the comparative function. This parameter is only available if the "Data format" is set to "1-byte scene extension (DPT 18.001)".	

Comparative value (V) (0 ... 255)	**0 ... 255**
This parameter defines the internal comparative value (V) for the comparative function. This parameter is only available if the "Data format" is set to "1-byte value 0 ... 255 (DPT 5.010)".	

Comparative value (V) (0 ... 100 %)	**0 ... 100**
This parameter defines the internal comparative value (V) for the comparative function. This parameter is only available if the "Data format" is set to "1-byte brightness value 0 ... 100 % (DPT 5.001)".	

Comparative value (V) (0 ... 65535)	**0 ... 65535**
This parameter defines the internal comparative value (V) for the comparative function. This parameter is only available if the "Data format" is set to "2-byte value 0 ... 65535 (DPT 7.001)".	

Comparative value (V) (−32768...32767)	**-32768...0 ... 32767**
This parameter defines the internal comparative value (V) for the comparative function. This parameter is only available if the "Data format" is set to "2-byte value -32768...32767 (DPT 8.001)".	

Comparative value (V) (−671088...670760)	**-671088...0 ... 670760**
This parameter defines the internal comparative value (V) for the comparative function. This parameter is only available if the "Data format" is set to "2-byte floating point number (DPT 9.0xx)".	

Comparative value (V) (−2147483648...2147483647)	**-2147483648...0 ... 2147483647**
This parameter defines the internal comparative value (V) for the comparative function. This parameter is only available if the "Data format" is set to "4-byte value -2147483648 ... 2147483647 (DPT 13.001)".	

ⓘ Two comparative values (V1 & V2) can be parameterised if the area check is configured as the "Comparative function". The setting options are identical in this case.

Transmission criterion	**Always send when updating the input** **Only send when the output changes** **Send cyclically**
The transmission behaviour of the output can be configured at this point. Always send when input is updated: The output transmits the current object value to the KNX with every telegram received at the input. Only send when the output changes: The output transmits the current object value only if the object value has changed compared to the last transmission. With the first telegram to an input after bus voltage return or after an ETS programming operation, the output always transmits the object value. Send cyclically: With this setting, the output cyclically transmits the current object value to the KNX. Cyclical sending is only started after bus voltage return or after an ETS programming operation once the first telegram has been received at the input. The output also transmits the object value as soon as a new telegram is received at the input. The cycle time for cyclical transmission is then restarted!	

Delay for sending the result in hours (0 ... 99)	**0 ... 99**
Optionally, a delay for sending the result (telegram at the output) can be configured. For "Always send when input is updated": Telegrams at the output are only transmitted when the delay has expired. The delay time is retriggered by each telegram at the input. For "Only send when output changes": Telegrams are only transmitted when the object value at the output changes after the delay has expired. If the logic function is processed again by a new telegram at the input within the delay time and the object value changes as a result, the delay starts again. If the object value of the output does not change due to new input telegrams, the delay does not start again. This parameter defines the hours of the delay time.	

Minutes (0 ... 59)	**0 ... 59**
This parameter defines the minutes of the delay time.	

Seconds (0 ... 59)	**0 ... 59**
This parameter defines the seconds of the delay time. The parameters for the transmission delay are only visible with "Transmission criterion" = "Always send when the input is updated" and "Only send when the output changes".	

Cycle time in hours (0 ... 99)	0 ... 99
This parameter defines the cycle time when transmitting the output cyclically. Setting the hours of the cycle time.	

Minutes (0 ... 59)	0 ... 5...59
This parameter defines the minutes of the cycle time.	

Seconds (0 ... 59)	0 ... 59
This parameter defines the seconds of the cycle time. The parameters for the cycle time are only visible with "Transmission criterion" = "Send cyclically".	

21.6.2 Comparator object list

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Comparator input	Logic ... – Input	4 bit	3,007	K, (L), S, -, A
4-bit object as input of a comparator. This object is only available if the type of logic function is configured to "Comparator" and the data format is configured to "4-bit dimming (DPT 3.007)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Comparator input	Logic ... – Input	1 byte	20,102	K, (L), S, -, A
1-byte object as input of a comparator. This object is only available if the type of logic function is configured to "Comparator" and the data format is configured to "1-byte switching operating mode (DPT 20.102)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Comparator input	Logic ... – Input	1 byte	18,001	K, (L), S, -, A
1-byte object as input of a comparator. This object is only available if the type of logic function is configured to "Comparator" and the data format is configured to "1-byte scene extension (DPT 18.001)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Comparator input	Logic ... – Input	1 byte	5,010	K, (L), S, -, A
1-byte object as input of a comparator. This object is only available if the type of logic function is configured to "Comparator" and the data format is configured to "1-byte value 0 ... 255 (DPT 5.010)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Comparator input	Logic ... – Input	1 byte	5,001	K, (L), S, -, A
1-byte object as input of a comparator. This object is only available if the type of logic function is configured to "Comparator" and the data format is configured to "1-byte brightness value 0 ... 100 % (DPT 5.001)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Comparator input	Logic ... – Input	2 bytes	7,001	K, (L), S, -, A
2-byte object as input of a comparator. This object is only available if the type of logic function is configured to "Comparator" and the data format is configured to "2-byte value 0 ... 65535 (DPT 7.001)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Comparator input	Logic ... – Input	2 bytes	8,001	K, (L), S, -, A
2-byte object as input of a comparator. This object is only available if the type of logic function is configured to "Comparator" and the data format is configured to "2-byte value -32768...32767 (DPT 8.001)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Comparator input	Logic ... – Input	2 bytes	9.xxx	K, (L), S, -, A
2-byte object as input of a comparator. This object is only available if the type of logic function is configured to "Comparator" and the data format is configured to "2-byte floating point number (DPT 9.0xx)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Comparator input	Logic ... – Input	4 bytes	13,001	K, (L), S, -, A
4-byte object as input of a comparator. This object is only available if the type of logic function is configured to "Comparator" and the data format is configured to "4-byte value -2147483648...2147483647 (DPT 13.001)".					

Object no.	Function	Name	Type	DPT	Flag
300, 305, 310, 315, 320, 325, 330, 335	Comparator output	Logic ... – Output	1 bit	1,002	K, (L), -, Ü, A
1-bit object as output of a comparator. The output object is fixed at 1-bit (DPT 1.002) and outputs the result of the comparative operation (ON = true / OFF = false). This object is only available if the type of logic function is configured to "Comparator".					

21.7 Limit switch

The limit switch works with an input whose data format can be parameterised and with a 1-bit output for outputting the result of the threshold value evaluation. The limit switch compares the value received at the input with two configurable hysteresis threshold values. As soon as the upper threshold value (H2) is reached or exceeded, the output can transmit a switching telegram (e.g. ON = true). If the value falls below the lower threshold value (H1), the output can transmit another switching telegram (e.g. OFF = false). Generally, the switching telegrams can be parameterised in the ETS when the threshold values are exceeded or not reached.

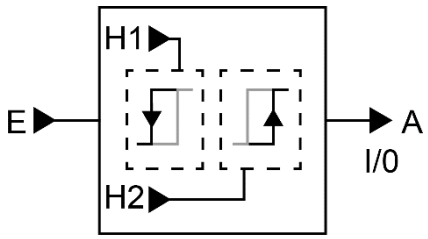


Fig. 191: Limit switch

The two threshold values define a hysteresis. The hysteresis prevents frequent switching back and forth of the output, provided that the input value changes continuously in small intervals. The output only switches the state if the value change at the input exceeds the hysteresis as a whole.

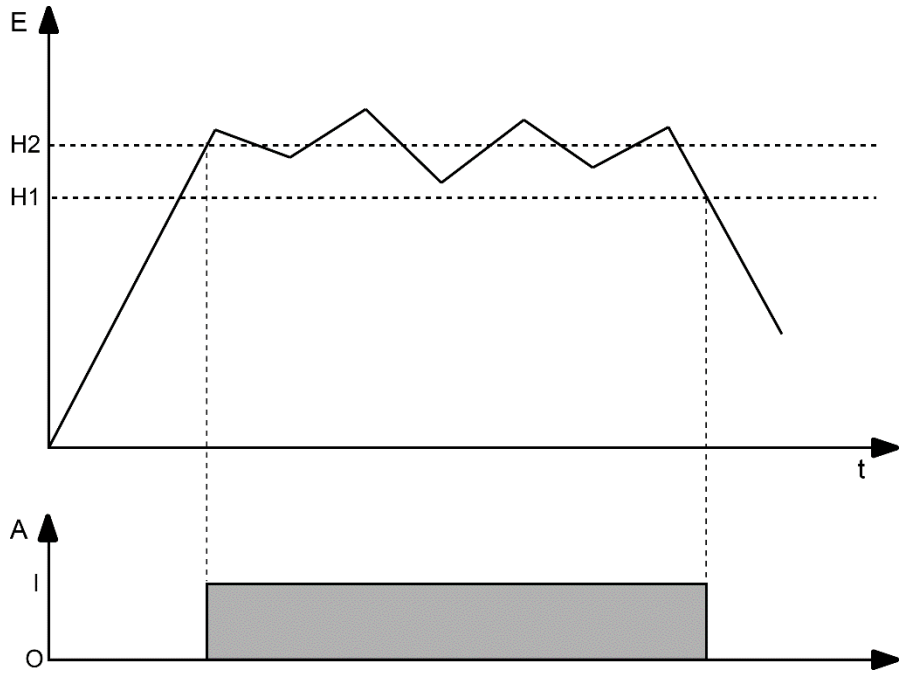


Fig. 192: Example of a hysteresis evaluation by upper and lower threshold value

ⓘ The two threshold values can be freely configured in the ETS. Make sure that the upper threshold value is greater than the lower threshold value!

ⓘ After bus voltage return or an ETS programming operation, the output always sends out a telegram when the first value has been received at the input. The telegram depends on whether the value reaches or exceeds the upper threshold value (H2) or not. If the value is smaller than the upper threshold value, a telegram is transmitted according to "Telegram when falling below the lower threshold value". Otherwise, the output transmits the "Telegram when the upper threshold value is exceeded".

The "Data format" parameter defines the size and formatting of the input object according to the following table. The output object is fixed at 1-bit (DPT 1.002) and outputs the result of the threshold evaluation (ON = true / OFF = false). The threshold values that can be set in the ETS adapt to the input data format.

Data format	KNX DPT
4-bit dimming	3,007
1-byte switching operating mode	20,102
1-byte scene extension	18,001
1-byte value 0 ... 255	5,010
1-byte brightness value 0 ... 100 %	5,001
2-byte value 0 ... 655535	7,001
2-byte value −32768...32767	8,001
2-byte floating point number	9.0xx
4-byte value −2147483648...2147483647	13,001

The transmission behaviour of the limit switch output can be configured.

21.7.1 Limit switch parameter

Logic functions → Logic function ...

Data format	**4-bit dimming (DPT 3.007)** **1-byte switching operating mode (DPT 20,102)** **1-byte scene extension (DPT 18.001)** **1-byte value 0 ... 255 (DPT 5.010)** **1-byte brightness value 0 ... 100 % (DPT 5.001)** **2-byte value 0 ... 655535 (DPT 7.001)** **2-byte value −32768...32767 (DPT 8.001)** **2-byte floating point number (DPT 9.0xx)** **4-byte value −2147483648...2147483647 (DPT 13.001)**
This parameter defines the size and formatting of the input object. The output object is fixed at 1-bit (DPT 1.002) and outputs the result of the threshold evaluation (ON = true / OFF = false).	

Lower threshold value (H1)	**Dim darker, stop (0)** **Dim darker, 100 % (1)** **Dim darker, 50 % (2)** **Dim darker, 25 % (3)** **Dim darker, 12.5 % (4)** **Dim darker, 6% (5)** **Dim darker, 3 % (6)** **Dim darker, 1.5 % (7)** **Dim brighter, stop (8)** **Dim brighter, 100 % (9)** **Dim brighter, 50 % (10)** **Dim brighter, 25 % (11)** **Dim brighter, 12.5 % (12)** **Dim brighter, 6% (13)** **Dim brighter, 3 % (14)** **Dim brighter, 1.5 % (15)**
This parameter sets the lower threshold value (H1) of the limit switch. This parameter is only available if the "Data format" is set to "4-bit dimming (DPT3.007)".	

Lower threshold value (H1)	**Automatic (0)** **Comfort mode (1)** **Standby mode (2)** **Night mode (3)** **Frost/heat protection (4)**
This parameter sets the lower threshold value (H1) of the limit switch. This parameter is only available if the "Data format" is set to "1-byte switching operating mode (DPT 20.102)".	

Lower threshold value (H1)	**Call up scene 1 (0)** **Call up scene 2 (1)** **...** **Call up scene 64 (63)** **Save scene 1 (128)** **Save scene 2 (129)** **...** **Save scene 64 (191)**
This parameter sets the lower threshold value (H1) of the limit switch. This parameter is only available if the "Data format" is set to "1-byte scene extension (DPT 18.001)".	

Lower threshold value (H1) (0 ... 255)	**0 ... 255**
This parameter sets the lower threshold value (H1) of the limit switch. This parameter is only available if the "Data format" is set to "1-byte value 0 ... 255 (DPT 5.010)".	

Lower threshold value (H1) (0 ... 100 %)	**0 ... 100**
This parameter sets the lower threshold value (H1) of the limit switch. This parameter is only available if the "Data format" is set to "1-byte brightness value 0 ... 100 % (DPT 5.001)".	

Lower threshold value (H1) (0 ... 65535)	**0 ... 65535**
This parameter sets the lower threshold value (H1) of the limit switch. This parameter is only available if the "Data format" is set to "2-byte value 0 ... 65535 (DPT 7.001)".	

Lower threshold value (H1) (−32768...32767)	**-32768...0 ... 32767**
This parameter sets the lower threshold value (H1) of the limit switch. This parameter is only available if the "Data format" is set to "2-byte value -32768...32767 (DPT 8.001)".	

Lower threshold value (H1) (−671088...670760)	**-671088...0 ... 670760**
This parameter sets the lower threshold value (H1) of the limit switch. This parameter is only available if the "Data format" is set to "2-byte floating point number (DPT 9.0xx)".	

Lower threshold value (H1) (−2147483648...2147483647)	**-2147483648...0 ... 2147483647**
This parameter sets the lower threshold value (H1) of the limit switch. This parameter is only available if the "Data format" is set to "4-byte value -2147483648...2147483647 (DPT 13.001)".	

Upper threshold value (H2)	**Dim darker, stop (0) Dim darker, 100 % (1) Dim darker, 50 % (2) Dim darker, 25 % (3) Dim darker, 12.5 % (4) Dim darker, 6% (5) Dim darker, 3 % (6) Dim darker, 1.5 % (7) Dim brighter, stop (8) Dim brighter, 100 % (9) Dim brighter, 50 % (10) Dim brighter, 25 % (11) Dim brighter, 12.5 % (12) Dim brighter, 6% (13) Dim brighter, 3 % (14) Dim brighter, 1.5 % (15)**
This parameter sets the upper threshold value (H2) of the limit switch. This parameter is only available if the "Data format" is set to "4-bit dimming (DPT 3.007)".	

Upper threshold value (H2)	Automatic (0) Comfort mode (1) Standby mode (2) Night mode (3) Frost/heat protection (4)
This parameter sets the upper threshold value (H2) of the limit switch. This parameter is only available if the "Data format" is set to "1-byte switching operating mode (DPT 20.102)".	

Upper threshold value (H2)	Call up scene 1 (0) Call up scene 2 (1) ... Call up scene 64 (63) Save scene 1 (128) Save scene 2 (129) ... Save scene 64 (191)
This parameter sets the upper threshold value (H2) of the limit switch. This parameter is only available if the "Data format" is set to "1-byte scene extension (DPT 18.001)".	

Upper threshold value (H2) (0 ... 255)	0 ... 255
This parameter sets the upper threshold value (H2) of the limit switch. This parameter is only available if the "Data format" is set to "1-byte value 0 ... 255 (DPT 5.010)".	

Upper threshold value (H2) (0 ... 100 %)	0 ... 100
This parameter sets the upper threshold value (H2) of the limit switch. This parameter is only available if the "Data format" is set to "1-byte brightness value 0 ... 100 % (DPT 5.001)".	

Upper threshold value (H2) (0 ... 65535)	0 ... 65535
This parameter sets the upper threshold value (H2) of the limit switch. This parameter is only available if the "Data format" is set to "2-byte value 0 ... 65535 (DPT 7.001)".	

Upper threshold value (H2) (−32768...32767)	-32768...0 ... 32767
This parameter sets the upper threshold value (H2) of the limit switch. This parameter is only available if the "Data format" is set to "2-byte value -32768...32767 (DPT 8.001)".	

Upper threshold value (H2) (−671088...670760)	-671088...0 ... 670760
This parameter sets the upper threshold value (H2) of the limit switch. This parameter is only available if the "Data format" is set to "2-byte floating point number (DPT 9.0xx)".	

Upper threshold value (H2) (−2147483648...2147483647)	-2147483648...0 ... 2147483647
This parameter sets the upper threshold value (H2) of the limit switch. This parameter is only available if the "Data format" is set to "4-byte value -2147483648...2147483647 (DPT 13.001)".	

Telegram when reaching or exceeding the upper threshold value	ON telegram OFF telegram
The telegram of the output when the upper threshold value is reached or exceeded can be parameterised at this point.	

Telegram when the lower threshold value is not reached	ON telegram OFF telegram
The telegram of the output when the value falls below the lower threshold value can be parameterised at this point.	

Transmission criterion	Always send when updating the input Only send when the output changes Send cyclically
The transmission behaviour of the output can be configured at this point. Always send when input is updated: The output transmits the current object value to the KNX with every telegram received at the input. Only send when the output changes: The output transmits the current object value only if the object value has changed compared to the last transmission. With the first telegram to an input after bus voltage return or after an ETS programming operation, the output always transmits the object value. Send cyclically: With this setting, the output cyclically transmits the current object value to the KNX. Cyclical sending is only started after bus voltage return or after an ETS programming operation once the first telegram has been received at the input. The output also transmits the object value as soon as a new telegram is received at the input. The cycle time for cyclical transmission is then restarted!	

Delay for sending the result in hours (0 ... 99)	0 ... 99
Optionally, a delay for sending the result (telegram at the output) can be configured. For "Always send when input is updated": Telegrams at the output are only transmitted when the delay has expired. The delay time is retriggered by each telegram at the input. For "Only send when output changes": Telegrams are only transmitted when the object value at the output changes after the delay has expired. If the logic function is processed again by a new telegram at the input within the delay time and the object value changes as a result, the delay starts again. If the object value of the output does not change due to new input telegrams, the delay does not start again. This parameter defines the hours of the delay time.	

Minutes (0 ... 59)	0 ... 59
This parameter defines the minutes of the delay time.	

Seconds (0 ... 59)	0 ... 59
This parameter defines the seconds of the delay time. The parameters for the transmission delay are only visible with "Transmission criterion" = "Always send when the input is updated" and "Only send when the output changes".	

Cycle time in hours (0 ... 99)	0 ... 99
This parameter defines the cycle time when transmitting the output cyclically. Setting the hours of the cycle time.	

Minutes (0 ... 59)	0 ... 5...59
This parameter defines the minutes of the cycle time.	

Seconds (0 ... 59)	0 ... 59
This parameter defines the seconds of the cycle time. The parameters for the cycle time are only visible with "Transmission criterion" = "Send cyclically".	

21.7.2 Limit switch object list

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Limit switch input	Logic ... – Input	4 bit	3,007	K, (L), S, -, A
4-bit object as input of a limit switch. This object is only available if the type of logic function is configured to "Limit switch" and the data format is configured to "4-bit dimming (DPT 3.007)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Limit switch input	Logic ... – Input	1 byte	20,102	K, (L), S, -, A
1-byte object as input of a limit switch. This object is only available if the type of logic function is configured to "Limit switch" and the data format is configured to "1-byte switching operating mode (DPT 20.102)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Limit switch input	Logic ... – Input	1 byte	18,001	K, (L), S, -, A
1-byte object as input of a limit switch. This object is only available if the type of logic function is configured to "Limit switch" and the data format is configured to "1-byte scene extension (DPT 18.001)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Limit switch input	Logic ... – Input	1 byte	5,010	K, (L), S, -, A
1-byte object as input of a limit switch. This object is only available if the type of logic function is configured to "Limit switch" and the data format is configured to "1-byte value 0 ... 255 (DPT 5.010)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Limit switch input	Logic ... – Input	1 byte	5,001	K, (L), S, -, A
1-byte object as input of a limit switch. This object is only available if the type of logic function is configured to "Limit switch" and the data format is configured to "1-byte brightness value 0 ... 100 % (DPT 5.001)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Limit switch input	Logic ... – Input	2 bytes	7,001	K, (L), S, -, A
2-byte object as input of a limit switch. This object is only available if the type of logic function is configured to "Limit switch" and the data format is configured to "2-byte value 0 ... 65535 (DPT 7.001)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Limit switch input	Logic ... – Input	2 bytes	8,001	K, (L), S, -, A
2-byte object as input of a limit switch. This object is only available if the type of logic function is configured to "Limit switch" and the data format is configured to "2-byte value -32768 ... 32767 (DPT 8.001)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Limit switch input	Logic ... – Input	2 bytes	9.xxx	K, (L), S, -, A
2-byte object as input of a limit switch. This object is only available if the type of logic function is configured to "Limit switch" and the data format is configured to "2-byte floating point number (DPT 9.0xx)".					

Object no.	Function	Name	Type	DPT	Flag
296, 301, 306, 311, 316, 321, 326, 331	Limit switch input	Logic ... – Input	4 bytes	13,001	K, (L), S, -, A
4-byte object as input of a limit switch. This object is only available if the type of logic function is configured to "Limit switch" and the data format is configured to "4-byte value -2147483648 ... 2147483647 (DPT 13.001)".					

Object no.	Function	Name	Type	DPT	Flag
300, 305, 310, 315, 320, 325, 330, 335	Limit switch output	Logic ... – Input	1 bit	1,002	K, (L), -, Ü, A
1-bit object as output of a limit switch. The output object is fixed at 1-bit (DPT 1.002) and outputs the result of the threshold evaluation (ON = true / OFF = false). This object is only available if the type of logic function is configured to "Limit switch".					