Application description

KNX Rotary sensor

4730-A

10.KNX4730A-E.2101

by Schneider Electric

1 Product definition

1.1 Product catalogue

Product name:	Rotary sensor
Use:	Sensor
Art.-no.:	4730-A

1.2 Function

The KNX rotary sensor combines the functions of a push-button sensor with extension connection and a bus coupling unit in a single device. The KNX rotary sensor follows the familiar operation concept of a press/rotary dimmer with incremental encoder. The rotary knob serves as a rocker function (turn to the left <-> turn to the right, e.g. dimming), the push-button serves as a push-button function (e.g. switching).
The KNX rotary sensor can be combined with the covers of conventional rotary dimmers in which KNX operating functions can be integrated conventionally into electrical installations.

The function of the rotary knob in the ETS alternative can be configured to the following functions: switching, dimming, Venetian blind, 1 byte value transmitter, 2-byte value transmitter, scene extension. Depending on the direction of rotation, the commands of the functions (ON, OFF / brighter, darker / UP, DOWN...) are transmitted to the bus via the communication objects assigned to the rotary knob.
The push-button can be configured to the following functions: switching, dimming, Venetian blind, 1 byte value transmitter, 2-byte value transmitter, scene extension, 2-channel operation. The function of the rotary knob can be combined with the function of the push-button or can be operated independently of it, too.

The KNX rotary sensor additionally has three extension inputs that affect the KNX separately from the push-button and rotary knob. The connected potential-free switch or button contacts are downloaded to the device via a shared reference potential. The inputs can transmit telegrams independent of each other for switching or dimming, for shutter control or transmitter application (dimmer value transmitter, light scene extension).
The connection of 230 V signals or other external voltages to the extension inputs is not permitted!

The device has an acoustic buzzer (Piezo signal transmitter) that can be used for acknowledgement or status signalling. Additionally, the integrated buzzer can signal a warning or ring tone, an alarm and an active programming mode. The volume of the buzzer can be differentiated in two states by means of a 1-bit communication object. The buzzer volume for alarm signalling can also be configured separately.

In addition, the device has two red Status LEDs. These Status LEDs can - only when Version 1.2 of the application is used - be switched on or off independently of one another, function as a button-press display or as a status display (control via separate communication object), as required. When functioning as a button-press display, the left LED displays operations of the push-button, whilst the right LED displays operations of the rotary knob.
The use of both Status LEDs is optional. If the visual display functions are required, then special design covers with a control window must be used (see accessories).

The device has an energy saving mode to save electrical energy during operation. If the function is used, the device switches to the energy saving mode after a preset time without operation or controlled by an external telegram to a separate object. In the energy saving mode, essential operation and signalling functions of the device are switched off. The acoustic signal transmitter and extension inputs are then without any functions. The energy saving mode can be deactivated by operating the rotary knob or push-button or by a special telegram. Afterwards, the device is fully functional again.

A bus coupling unit is already permanently integrated in the KNX rotary sensor, allowing the device to be connected directly to the bus line during commissioning. It requires no additional power supply for operation. For project design and commissioning of the device, ETS3.0 from Version "d" onwards, ETS4 from version 4.0.7 onwards or ETS5 is required.

2 Installation, electrical connection and operation

2.1 Safety instructions

Electrical equipment may only be installed and fitted by electrically skilled persons. The applicable accident prevention regulations must be observed.

Failure to observe the instructions may cause damage to the device and result in fire and other hazards.

Make sure during the installation that there is always sufficient insulation between the mains voltage and the bus. A minimum distance of at least 4 mm must be maintained between bus conductors and mains voltage cores.

Do not connect any external voltage to the inputs, since doing so may damage the device(s), and the SELV potential on the KNX bus line will no longer be available.

The device may not be opened or operated outside the technical specifications.

2.2 Device components

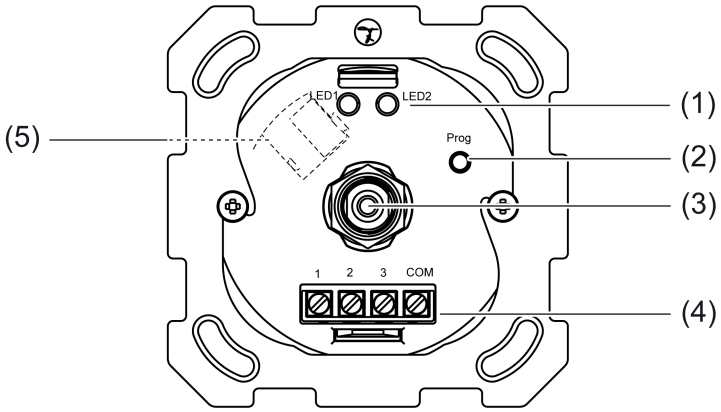

Figure 1: Device components (View of front side)

(1) Status LED (red)
(2) Programming button
(3) Slide-in shaft for rotary knob with push-button (incremental encoder)
(4) Terminals for extension inputs
(5) KNX bus connection

2.3 Fitting and electrical connection

Connecting and fitting the device

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 supply and cover up live parts in the working environment.

The device is installed in a standard flush-mounted appliance box or in suitable flush-mounted switch boxes. Potential-free contacts (e.g. installation switches or buttons, magnetic contacts) can be connected optionally as required.

i Ideally, the device should be installed in such a way that the Status LEDs are at the top.

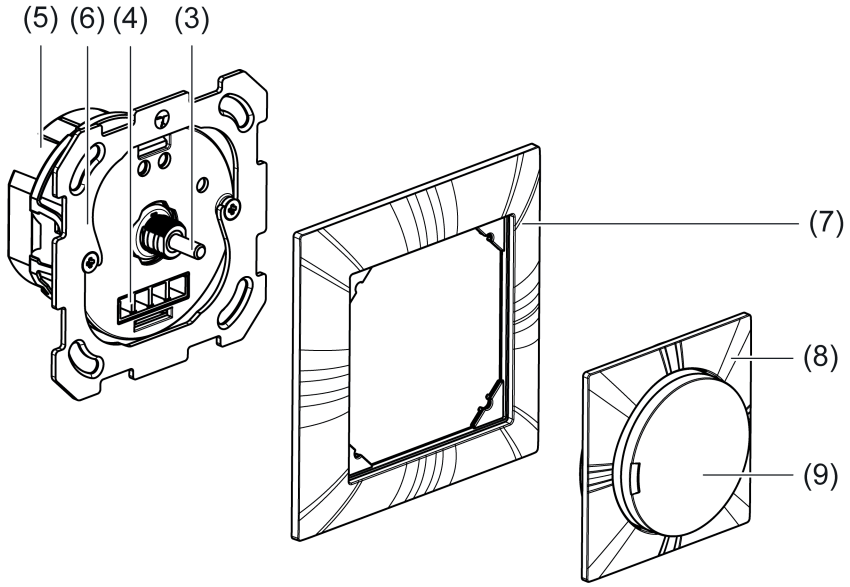

Figure 2: Mounting of the rotary sensor with design cover

(3) Slide-in shaft for rotary knob with push-button (incremental encoder)
(4) Terminals for extension inputs
(5) KNX bus connection
(6) Device with supporting plate
(7) Design frame (accessories)
(8) Design central plate (accessories)
(9) Design control button (accessories)

- Connect KNX bus line with terminal to bus connection (5).
- Optionally, connect potential-free contacts to the extension inputs (4) (Figure 3).

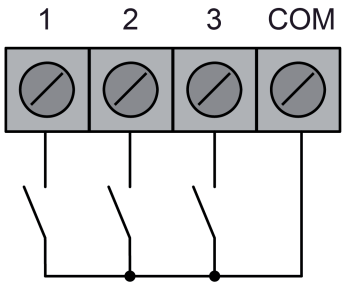

Figure 3: Connection of potential-free contacts to the extension inputs

- Install the device with supporting plate (6) in a flush-mounted appliance box.

i Before installing the decorative covers, program the physical address.

- Mount the design frame (7), the central plate (8) and the control button (9).

2.4 Commissioning

Programming the physical address

The commissioning of the device is basically confined to programming of the physical address and the application program with the ETS.

Project design and commissioning of the device using ETS3.0 from Version "d" onwards, ETS4 from version 4.0.7 onwards or ETS5.

The device is connected and ready for operation.

An appropriate device must be created and configured in the ETS project.

- Dismantle central plate(7) and control button (8) if the device has already been completely mounted (Figure 2).
- Activating Programming mode: press the programming button (2).

  The device indicates the programming mode with a pulsating tone (0.5 Hz) at maximum volume.
- Program the physical address with the help of the ETS.

  Signal tone becomes silent.

Programming the application program

After programming the physical address, the application must be loaded into the device. The ETS detects automatically whether a valid application has already been programmed into the device before. To reduce the programming time, the ETS downloads the whole application only if the device was programmed beforehand with another application or with no application at all. In all other cases, the ETS makes a time-optimised partial download in which only the modified data is loaded into the device.

2.5 Operation

The KNX rotary sensor combines the functions of a push-button sensor with extension connection and a bus coupling unit in a single device. The KNX rotary sensor follows the familiar operation concept of a press/rotary dimmer with incremental encoder. The rotary knob serves as a rocker function (turn to the left <-> turn to the right, e.g. dimming), the push-button serves as a push-button function (e.g. switching).

The function of the rotary knob is defined in the ETS. The rotary knob can be set to the following functions: switching, dimming, Venetian blind, 1-byte value transmitter, 2-byte value transmitter, scene extension. Depending on the direction of rotation, the commands of the functions (ON, OFF / brighter, darker / UP, DOWN...) are transmitted to the bus via the communication objects assigned to the rotary knob.
The push-button is configured in the ETS independently of the rotary knob and can therefore perform different functions, too. It is possible to combine the function of the rotary knob with the function of the push-button via the communication objects (e.g. control of an actuator: turning = dimming a lighting system / pressing = switching a lighting system). Alternatively, rotary knob and push-button can also be operated independently (e.g. control of separate actuators: turning = Venetian blind control / pressing = switching a lighting system).
The push-button can be configured to the following functions in the ETS: switching, dimming, Venetian blind, 1 byte value transmitter, 2-byte value transmitter, scene extension, 2-channel operation.

The KNX rotary sensor additionally has three extension inputs that affect the KNX separately from the push-button and rotary knob. The connected potential-free switch or button contacts are downloaded to the device via a shared reference potential. The inputs can transmit telegrams independent of each other for switching or dimming, for shutter control or transmitter application (dimmer value transmitter, light scene extension).

3 Technical data

General	
Protection class	III
Test mark	KNX
Ambient temperature	-25 ... +55 °C
Storage/transport temperature	-25 ... +55 °C
Relative humidity	5 ... 93 % (No moisture condensation)
KNX supply	
KNX medium	TP
Commissioning mode	S-mode
Rated voltage KNX	DC 21 ... 32 V SELV
Current consumption KNX	max. 12.5 mA
Connection type for bus	Device connection terminal
Extension inputs	
Poll voltage, extension inputs	approx. 20 V
Cable length	max. 5 m

4 Software description

4.1 Software specification

ETS search paths:	Push-button / Rotary sensor / Rotary sensor
Configuration:	S-mode standard
AST type:	"00"$_{Hex}$ / "0" $_{Dec}$
PEI connector:	no connector

Application program:

No.	Short description	Name	Version	from mask version
1	Multifunctional application program (rotary knob and push-button) incl. extension function and control of an acoustic signal transmitter and two Status LEDs.	Rotary sensor with extensions 473012	1.2 for ETS3.0 Version d, ETS4 and ETS5.	705

4.2 Software "Rotary sensor with extensions"

4.2.1 Scope of functions

General

- 1 x rotary knob (RK), 1 x push-button (PB), 3 x extension inputs for potential-free contacts.
- Shared disable object for rotary knob and push-button. Different disabling reactions configurable.
- Delay after bus voltage return, debounce time and telegram rate limit can be configured for the extension inputs.
- Acoustic buzzer (Piezo signal transmitter) for acknowledgement or status signalling or for signalling a warning, ring tone or alarm tone. The volume of the buzzer can be set.
- Two red Status LEDs can - only when Version 1.2 of the application is used - be switched on or off permanently independently of one another, function as a button-press display or as a status display (activation via separate communication object), as required. When functioning as a button-press display, the left LED displays operations of the push-button, whilst the right LED displays operations of the rotary knob.
- Energy saving mode for saving electrical energy. The device can switch to the energy saving mode without operation after a preset time or controlled by an external telegram. In the energy saving mode, essential operation and signalling functions of the device are switched off. The acoustic signal transmitter and extension inputs are then without any functions.

Push-button (PB)

- Free allocation of the functions switching, dimming, Venetian blind, 1-byte value transmitter, 2-byte value transmitter, scene extension, 2-channel operation.
- Scope of detail for the "Switching" function:
  Command on pressing and releasing the button is independently adjustable (ON, OFF, TOGGLE, no reaction).
- Scope of detail for the "Dimming" function:
  Command on pressing the button is adjustable (no reaction, lighter - ON, darker - OFF, lighter/darker - TOGGLE, lighter - TOGGLE, darker - TOGGLE). Time between dimming and switching and dimming step width is adjustable. Telegram repetition and stop telegram transmission possible.
- Scope of detail for the "Venetian blind" function:
  Command on pressing the button is adjustable (no reaction, UP, DOWN, TOGGLE). Operation concept configurable. Time adjustable between short-time and long-time operation (only for short – long – short) Adjustable slat adjustment time (time during which a long time command can be terminated by releasing the push-button).
- Scope of detail for the "1-byte value transmitter" and "2-byte value transmitter" functions:
  1-byte: Choice of value range (0...100 %, 0...255) / 2-byte: function configurable (temperature value transmitter, brightness value transmitter, transmitter 0...65535)
  On a long button-press, value adjustment with different step widths and optional overflow when the end of the value range is reached.
- Scope of detail for the "Scene extension" function:
  Recall of one from up to 64 external scenes via the extension object of the button. Optionally with storage function on a long button-press.
- Scope of detail for the "2-channel operation" function:
  Operation of up to two independent channels. This means that only one button-press is enough to transmit up to two telegrams to the bus. The channels can be configured independently of one another for the Switching, Value transmitter (1 byte) or Temperature value transmitter (2 bytes) functions.

Rotary knob (RK)

- Free allocation of the functions switching, dimming, Venetian blind, 1-byte value transmitter, 2-byte value transmitter, scene extension.

- Scope of detail for the "Switching" function:
  Command on turning clockwise and anticlockwise is separately adjustable (ON, OFF, TOGGLE, no reaction). Optionally, separate objects for both directions of rotation (e.g. for controlling different actuation channels).
- Scope of detail for the "Dimming" function:
  Operation concept is adjustable (dimming with or without OFF telegram / dimming comfort: Operation dependent on speed and rotation angle). Command on turning is configurable depending on the direction of rotation (brighter - ON, darker - OFF). Dimming step width in the operation concept "Dimming comfort" is adjustable.
- Scope of detail for the "Venetian blind" function:
  Operation concept: Move - Step. Command on turning is adjustable depending on the direction of rotation (UP, DOWN). Rotation angle for slat adjustment is definable.
- Scope of detail for the "1-byte value transmitter" and "2-byte value transmitter" functions:
  1-byte: Choice of function (0...100 %, 0...255, value transmitter comfort 0...255: speed dependent operation for value adjustment) / 2-byte: function configurable (temperature value transmitter, brightness value transmitter, transmitter 0...65535)
  Value adjustment with different step widths, direction of the value adjustment and optional overflow when the end of the value range is reached.
- Scope of detail for the "Scene extension" function:
  Recall of one from up to 64 external scenes via the extension object of the rotary knob. Different scenes can be recalled depending on the direction of rotation. Without memory function.
- Time definition for standstill of the rotary knob for detecting a new operation.

Extension inputs (E1, E2, E3)

- Free allocation of the functions switching, dimming, Venetian blind and value transmitter.
- Behaviour on bus voltage return can be configured separately for each input.
- Scope of detail for the "Switching" function:
  Two independent switching objects available for each input (switching commands can be configured individually).
  Command can be set independently for rising and falling edge (ON, OFF, TOGGLE, no reaction).
  Independent cyclical transmission of the switching objects can be selected depending on the edge or depending on the object value.
- Scope of detail for the "Dimming" function:
  Single-surface and double-surface operation possible.
  Time between dimming and switching and dimming step width is adjustable.
  Telegram repetition and stop telegram transmission possible.
- Scope of detail for the "Venetian blind" function:
  Command can be set independently for rising edge (no function, UP, DOWN, TOGGLE).
  Operation concept configurable (short – long – short or long – short).
  Time adjustable between short-time and long-time operation (only for short – long – short)
  Adjustable slat adjustment time (time during which a MOVE command can be terminated by releasing a pushbutton on the input).
- Scope of detail for the "Value transmitter" function:
  Edge (pushbutton as NO contact, pushbutton as NC contact, switch) and value for edge can be configured.
  Value adjustment for pushbutton long key-press possible for value transmitter.
  For light scene extension with memory function, the scene can also be saved without prior recall.
- Disable object for disabling individual inputs (polarity of the disable object is adjustable).

4.2.2 Notes on software

ETS project design and commissioning

For project design and commissioning of the device, ETS3.0 from Version "d" onwards, ETS4 from version 4.0.7 onwards or ETS5 is required. The product database is offered in the *.VD4 format. No product database is available for ETS2 and older versions of ETS3.

Unloading of the application program

If the application program is unloaded by the ETS, the Status LEDs flash at a slow rate in an alternating pattern (approx. 0.75 Hz). In this case, the device no longer reacts to operations nor does it execute signalling functions anymore. The delivery state (see page 94) described cannot be restored by unloading with the ETS.

4.2.3 Object table

Number of communication objects:	30 (max. object number 29)
Number of addresses (max):	254
Number of assignments (max):	255
Maximum table length	255

4.2.3.1 Objects push-button

Function:	Switching				
Object	Function	Name	Type	DPT	Flag
0	Switching	Push-button - Output	1-bit	1.xxx	C, W, T, (R) [1]
Description	1-bit object for transmission of switching telegrams (ON, OFF).				

Function:	Dimming				
Object	Function	Name	Type	DPT	Flag
0	Switching	Push-button - Output	1-bit	1.xxx	C, W, T, (R) [1]
Description	1-bit object for transmission of switching telegrams (ON, OFF).				

Function:	Dimming				
Object	Function	Name	Type	DPT	Flag
1	Dimming	Push-button - Output	4-bit	3.007	C, W, T, (R) [1]
Description	4-bit object for the transmission of relative dimming telegrams.				

Function:	Venetian blind				
Object	Function	Name	Type	DPT	Flag
0	Short time operation	Push-button - Output	1-bit	1.007	C, -, T, (R) [1]
Description	1-bit object for the transmission of telegrams with which a Venetian blind or shutter drive motor can be stopped or with which the blind slats can be adjusted by short time operation.				

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

Function:	Venetian blind				
Object	Function	Name	Type	DPT	Flag
1	Long-time operation	Push-button - Output	1-bit	1.008	C, W, T, (R) [1]

Description: 1-bit object for the transmission of telegrams with which a Venetian blind or shutter drive motor can be can be moved upwards or downwards.

Function:	1-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
0	Value	Push-button - Output	1 byte	5.xxx	C, W, T, (R) [1]

Description: 1-byte object for the transmission of values from 0 to 255 (corresponding to values from 0 % to 100 %). If the adjustment of the value is enabled, the object can transmit telegrams cyclically after a long press through which the value can be reduced or increased by a set step width.

Function:	2-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
0	Value	Push-button - Output	2 byte	7.xxx	C, W, T, (R) [1]

Description: 2-byte object for the transmission of values from 0 to 65535. If the adjustment of the value is enabled, the object can transmit telegrams cyclically after a long press through which the value can be reduced or increased by a presettable step width.

Function:	2-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
0	Temperature value	Push-button - Output	2 byte	9.001	C, W, T, (R) [1]

Description: 2 -byte object for the transmission of a temperature value from 0 °C to 40 °C. If the adjustment of the value is enabled, the object can transmit telegrams cyclically after a long press with which the value can be reduced or increased by 1 K.

Function:	2-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
0	Brightness value	Push-button - Output	2 byte	9.004	C, W, T, (R) [1]

Description: 2-byte object for the transmission of a brightness level value from 0 to 1500 lux. If the adjustment of the value is enabled, the object can transmit cyclical telegrams after a long press with which the value can be reduced or increased by 50 lux.

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

Function:	Scene extension				
Object	Function	Name	Type	DPT	Flag
0	Scene extension	Push-button - Output	1 byte	18.001	C, -, T, (R) [1]

Description 1-byte object for recalling or for storing one of 64 scenes max. from a scene push button sensor.

Function:	2-channel operation				
Object	Function	Name	Type	DPT	Flag
0	Channel 1 switching	Push-button - Output	1-bit	1.xxx	C, W, T, (R) [1]

Description 1-bit object for the transmission of switching telegrams, if 2-channel operation is activated.

Function:	2-channel operation				
Object	Function	Name	Type	DPT	Flag
0	Channel 1 value	Push-button - Output	1 byte	5.xxx	C, -, T, (R) [1]

Description 1-byte object for the transmission of value telegrams, if 2-channel operation is activated.

Function:	2-channel operation				
Object	Function	Name	Type	DPT	Flag
0	Channel 1 temperature value	Push-button - Output	2 byte	9.001	C, -, T, (R) [1]

Description 2-byte object for the transmission of temperature value telegrams if 2-channel operation is activated.

Function:	2-channel operation				
Object	Function	Name	Type	DPT	Flag
1	Channel 2 switching	Push-button - Output	1-bit	1.xxx	C, W, T, (R) [1]

Description 1-bit object for the transmission of switching telegrams, if 2-channel operation is activated.

Function:	2-channel operation				
Object	Function	Name	Type	DPT	Flag
1	Channel 2 value	Push-button - Output	1 byte	5.xxx	C, -, T, (R) [1]

Description 1-byte object for the transmission of value telegrams, if 2-channel operation is activated.

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

Function: 2-channel operation

Object	Function	Name	Type	DPT	Flag
 [1]	Channel 2 temperature value	Push-button - Output	2 byte	9.001	C, -, T, (R) [1]

Description 2-byte object for the transmission of temperature value telegrams if 2-channel operation is activated.

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

4.2.3.2 Objects rotary knob

Function:	Switching				
Object	Function	Name	Type	DPT	Flag
4	Switching	Rotary knob - output	1-bit	1.xxx	C, W, T, (R) [1]
Description	1-bit object for transmitting switching telegrams (ON, OFF) if the commands of the rotary knob are transmitted via a shared object during a clockwise and anticlockwise operation.				

Function:	Switching				
Object	Function	Name	Type	DPT	Flag
4	Switching in clockwise direction	Rotary knob - output	1-bit	1.xxx	C, W, T, (R) [1]
Description	1-bit object for transmitting switching telegrams (ON, OFF) if the command of the rotary knob should be transmitted via its own object during a clockwise operation.				

Function:	Switching				
Object	Function	Name	Type	DPT	Flag
5	Switching in anticlockwise direction	Rotary knob - output	1-bit	1.xxx	C, W, T, (R) [1]
Description	1-bit object for transmitting switching telegrams (ON, OFF) if the command of the rotary knob should be transmitted via its own object during an anticlockwise operation.				

Function:	Dimming				
Object	Function	Name	Type	DPT	Flag
4	Switching	Rotary knob - output	1-bit	1.xxx	C, W, T, (R) [1]
Description	1-bit object for transmission of switching telegrams (ON, OFF).				

Function:	Dimming				
Object	Function	Name	Type	DPT	Flag
5	Dimming	Rotary knob - output	4-bit	1.007	C, W, T, (R) [1]
Description	4-bit object for the transmission of relative dimming telegrams.				

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

Function:	Dimming				
Object	Function	Name	Type	DPT	Flag
6	Feedback brightness value	Rotary knob - input	1 byte	5.001	C, W, -, (R) [1]

Description: 1-byte object for receiving a brightness value feedback of a dimmer actuator. Only visible in the operation concepts "dimming with OFF telegram" or "dimming comfort with OFF telegram".

Function:	Venetian blind				
Object	Function	Name	Type	DPT	Flag
4	Short time operation	Rotary knob - output	1-bit	1.007	C, -, T, (R) [2]

Description: 1-bit object for the transmission of telegrams with which a Venetian blind or shutter drive motor can be stopped or with which the blind slats can be adjusted by short time operation.

Function:	Venetian blind				
Object	Function	Name	Type	DPT	Flag
5	Long-time operation	Rotary knob - output	1-bit	1.008	C, W, T, (R) [2]

Description: 1-bit object for the transmission of telegrams with which a Venetian blind or shutter drive motor can be can be moved upwards or downwards.

Function:	1-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
4	Value	Rotary knob - output	1 byte	5.xxx	C, W, T, (R) [2]

Description: 1-byte object for the transmission of values from 0 to 255 (corresponding to values from 0 % to 100 %). If the adjustment of the value is enabled, the object can transmit telegrams cyclically after long actuation with which the value can be reduced or increased by a presettable amount.

Function:	1-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
5	Feedback value	Rotary knob - input	1 byte	5.xxx	C, W, -, (R) [1]

Description: 1-byte object for receiving a value feedback of an actuator (e.g. brightness value, position value). A value adjustment is always based on the value in this communication object.
Visible only with function "Value transmitter comfort 0...255".

1: For reading, the R-flag must be set. The last value written to the object via the bus will be read.

2: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

Function: 2-byte value transmitter

Object	Function	Name	Type	DPT	Flag
4	Value	Rotary knob - output	2 byte	7.xxx	C, W, T, (R) [1]

Description: 2-byte object for the transmission of values from 0 to 65535. If the adjustment of the value is enabled, the object can transmit telegrams cyclically after long actuation with which the value can be reduced or increased by a presettable amount.

Function: 2-byte value transmitter

Object	Function	Name	Type	DPT	Flag
4	Temperature value	Rotary knob - output	2 byte	9.001	C, W, T, (R) [1]

Description: 2 -byte object for the transmission of a temperature value from 0 °C to 40 °C. If the adjustment of the value is enabled, the object can transmit telegrams cyclically after a long press with which the value can be reduced or increased by 1 K.

Function: 2-byte value transmitter

Object	Function	Name	Type	DPT	Flag
4	Brightness value	Rotary knob - output	2 byte	9.004	C, W, T, (R) [1]

Description: 2-byte object for the transmission of a brightness level value from 0 to 1500 lux. If the adjustment of the value is enabled, the object can transmit cyclical telegrams after a long press with which the value can be reduced or increased by 50 lux.

Function: Scene extension

Object	Function	Name	Type	DPT	Flag
4	Scene extension	Rotary knob - output	1 byte	18.001	C, -, T, (R) [1]

Description: 1-byte object for recalling or for storing one of 64 scenes max. from a scene push button sensor.

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

4.2.3.3 Objects disabling functions push-button rotary knob

Objects for disabling function of the push-button

Function:	Switching				
Object	Function	Name	Type	DPT	Flag
2	Switching	Push-button disabling function - Output	1-bit	1.xxx	C, W, T, (R) [1]
Description	1-bit object for transmission of switching telegrams (ON, OFF).				

Function:	Dimming				
Object	Function	Name	Type	DPT	Flag
2	Switching	Push-button disabling function - Output	1-bit	1.xxx	C, W, T, (R) [1]
Description	1-bit object for transmission of switching telegrams (ON, OFF).				

Function:	Dimming				
Object	Function	Name	Type	DPT	Flag
3	Dimming	Push-button disabling function - Output	4-bit	1.007	C, W, T, (R) [1]
Description	4-bit object for the transmission of relative dimming telegrams.				

Function:	Venetian blind				
Object	Function	Name	Type	DPT	Flag
2	Short time operation	Push-button disabling function - Output	1-bit	1.007	C, -, T, (R) [1]
Description	1-bit object for the transmission of telegrams with which a Venetian blind or shutter drive motor can be stopped or with which the blind slats can be adjusted by short time operation.				

Function:	Venetian blind				
Object	Function	Name	Type	DPT	Flag
3	Long-time operation	Push-button disabling function - Output	1-bit	1.008	C, W, T, (R) [1]
Description	1-bit object for the transmission of telegrams with which a Venetian blind or shutter drive motor can be can be moved upwards or downwards.				

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

Function:	1-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
2	Value	Push-button disabling function - Output	1 byte	5.xxx	C, W, T, (R) [1]

Description: 1-byte object for the transmission of values from 0 to 255 (corresponding to values from 0 % to 100 %). If the adjustment of the value is enabled, the object can transmit telegrams cyclically after long actuation with which the value can be reduced or increased by a presettable amount.

Function:	2-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
2	Value	Push-button disabling function - Output	2 byte	7.xxx	C, W, T, (R) [1]

Description: 2-byte object for the transmission of values from 0 to 65535. If the adjustment of the value is enabled, the object can transmit telegrams cyclically after long actuation with which the value can be reduced or increased by a presettable amount.

Function:	2-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
2	Temperature value	Push-button disabling function - Output	2 byte	9.001	C, W, T, (R) [1]

Description: 2 -byte object for the transmission of a temperature value from 0 °C to 40 °C. If the adjustment of the value is enabled, the object can transmit telegrams cyclically after a long press with which the value can be reduced or increased by 1 K.

Function:	2-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
2	Brightness value	Push-button disabling function - Output	2 byte	9.004	C, W, T, (R) [1]

Description: 2-byte object for the transmission of a brightness level value from 0 to 1500 lux. If the adjustment of the value is enabled, the object can transmit cyclical telegrams after a long press with which the value can be reduced or increased by 50 lux.

Function:	Scene extension				
Object	Function	Name	Type	DPT	Flag
2	Scene extension	Push-button disabling function - Output	1 byte	18.001	C, -, T, (R) [1]

Description: 1-byte object for recalling or for storing one of 64 scenes max. from a scene push button sensor.

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

Function:	2-channel operation				
Object	Function	Name	Type	DPT	Flag
2	Channel 1 switching	Push-button disabling function - Output	1-bit	1.xxx	C, W, T, (R) [1]

Description 1-bit object for the transmission of switching telegrams, if 2-channel operation is activated.

Function:	2-channel operation				
Object	Function	Name	Type	DPT	Flag
2	Channel 1 value	Push-button disabling function - Output	1 byte	5.xxx	C, -, T, (R) [1]

Description 1-byte object for the transmission of value telegrams, if 2-channel operation is activated.

Function:	2-channel operation				
Object	Function	Name	Type	DPT	Flag
2	Channel 1 temperature value	Push-button disabling function - Output	2 byte	9.001	C, -, T, (R) [1]

Description 2-byte object for the transmission of temperature value telegrams if 2-channel operation is activated.

Function:	2-channel operation				
Object	Function	Name	Type	DPT	Flag
3	Channel 2 switching	Push-button disabling function - Output	1-bit	1.xxx	C, W, T, (R) [1]

Description 1-bit object for the transmission of switching telegrams, if 2-channel operation is activated.

Function:	2-channel operation				
Object	Function	Name	Type	DPT	Flag
3	Channel 2 value	Push-button disabling function - Output	1 byte	5.xxx	C, -, T, (R) [1]

Description 1-byte object for the transmission of value telegrams, if 2-channel operation is activated.

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

Function:	2-channel operation				
Object	Function	Name	Type	DPT	Flag
3	Channel 2 temperature value	Push-button disabling function - Output	2 byte	9.001	C, -, T, (R) [1]

Description 2-byte object for the transmission of temperature value telegrams if 2-channel operation is activated.

Objects for disabling function of the rotary knob

Function:	Switching				
Object	Function	Name	Type	DPT	Flag
7	Switching	Rotary knob disabling function - output	1-bit	1.xxx	C, W, T, (R) [1]

Description 1-bit object for transmitting switching telegrams (ON, OFF) if the commands of the rotary knob are transmitted via a shared object during a clockwise and anticlockwise operation.

Function:	Switching				
Object	Function	Name	Type	DPT	Flag
7	Switching in clockwise direction	Rotary knob disabling function - output	1-bit	1.xxx	C, W, T, (R) [1]

Description 1-bit object for transmitting switching telegrams (ON, OFF) if the command of the rotary knob should be transmitted via its own object during a clockwise operation.

Function:	Switching				
Object	Function	Name	Type	DPT	Flag
8	Switching in anticlockwise direction	Rotary knob disabling function - output	1-bit	1.xxx	C, W, T, (R) [1]

Description 1-bit object for transmitting switching telegrams (ON, OFF) if the command of the rotary knob should be transmitted via its own object during an anticlockwise operation.

Function:	Dimming				
Object	Function	Name	Type	DPT	Flag
7	Switching	Rotary knob disabling function - output	1-bit	1.xxx	C, W, T, (R) [1]

Description 1-bit object for transmission of switching telegrams (ON, OFF).

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

Function:	Dimming				
Object	Function	Name	Type	DPT	Flag
8	Dimming	Rotary knob disabling function - output	4-bit	1.007	C, W, T, (R) [1]

Description 4-bit object for the transmission of relative dimming telegrams.

Function:	Dimming				
Object	Function	Name	Type	DPT	Flag
9	Feedback brightness value	Rotary knob disabling function - input	1 byte	5.001	C, W, -, (R) [2]

Description 1-byte object for receiving a brightness value feedback of a dimmer actuator. Only visible in the operation concepts "dimming with OFF telegram" or "dimming comfort with OFF telegram".

Function:	Venetian blind				
Object	Function	Name	Type	DPT	Flag
7	Short time operation	Rotary knob disabling function - output	1-bit	1.007	C, -, T, (R) [1]

Description 1-bit object for the transmission of telegrams with which a Venetian blind or shutter drive motor can be stopped or with which the blind slats can be adjusted by short time operation.

Function:	Venetian blind				
Object	Function	Name	Type	DPT	Flag
8	Long-time operation	Rotary knob disabling function - output	1-bit	1.008	C, W, T, (R) [1]

Description 1-bit object for the transmission of telegrams with which a Venetian blind or shutter drive motor can be can be moved upwards or downwards.

Function:	1-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
7	Value	Rotary knob disabling function - output	1 byte	5.xxx	C, W, T, (R) [1]

Description 1-byte object for the transmission of values from 0 to 255 (corresponding to values from 0 % to 100 %). If the adjustment of the value is enabled, the object can transmit telegrams cyclically after long actuation with which the value can be reduced or increased by a presettable amount.

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

2: For reading, the R-flag must be set. The last value written to the object via the bus will be read.

Function:	1-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
 8	Feedback value	Rotary knob disabling function - input	1 byte	5.xxx	C, W, -, (R) [1]

Description: 1-byte object for receiving a value feedback of an actuator (e.g. brightness value, position value). A value adjustment is always based on the value in this communication object.
Visible only with function "Value transmitter comfort 0...255".

Function:	2-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
 7	Value	Rotary knob disabling function - output	2 byte	7.xxx	C, W, T, (R) [2]

Description: 2-byte object for the transmission of values from 0 to 65535. If the adjustment of the value is enabled, the object can transmit telegrams cyclically after long actuation with which the value can be reduced or increased by a presettable amount.

Function:	2-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
 7	Temperature value	Rotary knob disabling function - output	2 byte	9.001	C, W, T, (R) [2]

Description: 2 -byte object for the transmission of a temperature value from 0 °C to 40 °C. If the adjustment of the value is enabled, the object can transmit telegrams cyclically after a long press with which the value can be reduced or increased by 1 K.

Function:	2-byte value transmitter				
Object	Function	Name	Type	DPT	Flag
 7	Brightness value	Rotary knob disabling function - output	2 byte	9.004	C, W, T, (R) [2]

Description: 2-byte object for the transmission of a brightness level value from 0 to 1500 lux. If the adjustment of the value is enabled, the object can transmit cyclical telegrams after a long press with which the value can be reduced or increased by 50 lux.

1: For reading, the R-flag must be set. The last value written to the object via the bus will be read.

2: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

Function:	Scene extension				
Object	Function	Name	Type	DPT	Flag
7	Scene extension	Rotary knob disabling function - output	1 byte	18.001	C, -, T, (R) [1]

Description 1-byte object for recalling or for storing one of 64 scenes max. from a scene push button sensor.

Objects for activating / deactivating the disabling function

Function:	Disabling function				
Object	Function	Name	Type	DPT	Flag
10	Disabling	Push-button/rotary knob - input	1-bit	1.001	C, W, -, (R) [2]

Description 1-bit object with which the disabling function of the push-button and rotary knob can be activated and deactivated (polarity can be configured).
Only visible if the disabling function affects the push-button and rotary knob.

Function:	Disabling function				
Object	Function	Name	Type	DPT	Flag
10	Disabling	Push-button - input	1-bit	1.001	C, W, -, (R) [2]

Description 1-bit object with which the disabling function of the push-button can be activated and deactivated (polarity can be configured).
Only visible if the disabling function only affects the push-button.

Function:	Disabling function				
Object	Function	Name	Type	DPT	Flag
10	Disabling	Rotary knob - input	1-bit	1.001	C, W, -, (R) [2]

Description 1-bit object with which the disabling function of the rotary knob can be activated and deactivated (polarity can be configured).
Only visible if the disabling function only affects the rotary knob.

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

2: For reading, the R-flag must be set. The last value written to the object via the bus will be read.

4.2.3.4 Objects Buzzer

Objects for warning/ring tone and status

Function:	Warning/ring tone				
Object	Function	Name	Type	DPT	Flag
13	Warning/ring tone	Buzzer - Input	1-bit	1.xxx	C, W, -, (R) [1]

Description: 1-bit object for controlling the internal buzzer of the device for warning/ring tone signalling.
As soon as a "1"-telegram is received, the buzzer outputs a single tone. The signal duration can be configured in the ETS. The tone can also be switched off before the signal duration has elapsed by receiving a "0" telegram via the object. Each "1" telegram retriggers the tone output.

Function:	Status				
Object	Function	Name	Type	DPT	Flag
13	Status	Buzzer - Input	1-bit	1.xxx	C, W, -, (R) [1]

Description: 1-bit object for controlling the internal buzzer of the device for a status signal. As soon as a "1"-telegram is received, the buzzer outputs the configured tone for the preset signal duration. The tone can also be switched off before the signal duration has elapsed by receiving a "0" telegram via the status object. Each "1" telegram retriggers the tone output.

Function:	Changing volume				
Object	Function	Name	Type	DPT	Flag
14	Changing volume	Buzzer - Input	1-bit	1.xxx	C, W, -, (R) [1]

Description: 1-bit object for changing the volume of the internal buzzer of the device for function-dependent signalling and for the warning/ring tone in two settings (volume 1, volume 2). The telegram polarity can be configured in the ETS.

Objects for alarm function

Function:	Alarm function				
Object	Function	Name	Type	DPT	Flag
15	Switching alarm	Buzzer - Input	1-bit	1.xxx	C, W, -, (R) [1]

Description: 1-bit object for the reception of an alarm signalling (polarity configurable).

1: For reading, the R-flag must be set. The last value written to the object via the bus will be read.

Function: Alarm function

Object	Function	Name	Type	DPT	Flag
16	Acknowledging alarm	Buzzer - Output	1-bit	1.xxx	C, -, T, (R) [1]

Description 1-bit object for transmitting the acknowledgement of an alarm signalling (polarity configurable).

1: For reading, the R-flag must be set. The last value written to the object via the bus or by the device will be read.

4.2.3.5 Objects Status-LED

Objects for status LED

Function:	Status				
Object	Function	Name	Type	DPT	Flag
11	Switching	Push-button - Status LED	1-bit	1.xxx	C, W, -, (R) [1]
Description	1-bit object for activation of the left status LED for status signalling (polarity configurable).				

Function:	Status				
Object	Function	Name	Type	DPT	Flag
12	Switching	Rotary knob - Status LED	1-bit	1.xxx	C, W, -, (R) [1]
Description	1-bit object for activation of the right status LED for status signalling (polarity configurable).				

1: For reading, the R-flag must be set. The last value written to the object via the bus will be read.

4.2.3.6 Object energy saving mode

Function:	Energy saving mode				
Object	Function	Name	Type	DPT	Flag
17	Activate / deactivate	Energy saving mode - Input	1-bit	1.001	C, W, -, (R) [1]

Description: 1-bit object for activating or deactivating the energy saving mode.
The function (only activate, only deactivate, activate and deactivate) and the telegram polarity are configurable.

1: For reading, the R-flag must be set. The last value written to the object via the bus will be read.

4.2.3.7 Extension input objects

Function:	Switching				
Object	Function	Name	Type	DPT	Flag
18, 19, 20	Switching object X.1	Extension input 1...3 - output	1-bit	1.001	C, W, T [1]
Description	1-bit object for the transmission of switching telegrams (ON, OFF) (first switching object)				

Function:	Switching				
Object	Function	Name	Type	DPT	Flag
21, 22, 23	Switching object X.2	Extension input 1...3 - output	1-bit	1.001	C, W, T [1]
Description	1-bit object for the transmission of switching telegrams (ON, OFF) (second switching object)				

Function:	Dimming				
Object	Function	Name	Type	DPT	Flag
18, 19, 20	Switching	Extension input 1...3 - output	1-bit	1.001	C, W, T [1]
Description	1-bit object for the transmission of switching telegrams (ON, OFF) for the dimming function.				

Function:	Dimming				
Object	Function	Name	Type	DPT	Flag
21, 22, 23	Dimming	Extension input 1...3 - output	4-bit	3.007	C, W, T [1]
Description	4-bit object for change of relative brightness between 0 and 100 %.				

Function:	Venetian blind				
Object	Function	Name	Type	DPT	Flag
18, 19, 20	Short time operation	Extension input 1...3 - output	1-bit	1.008	C, -, T [1]
Description	1-bit object for short-time operation of a blind.				

Function:	Venetian blind				
Object	Function	Name	Type	DPT	Flag
21, 22, 23	Long-time operation	Extension input 1...3 - output	1-bit	1.007	C, W, T [1]
Description	1-bit object for long-time operation of a blind.				

1: Each communication object can be read out. For reading, the R-flag must be set.

Function:	Value transmitter (dimming value transmitter)				
Object	Function	Name	Type	DPT	Flag
18, 19, 20	Value	Extension input 1...3 - output	1 byte	5.001	C, -, T [1]

Description: 1 byte object to transmit value telegrams (0 ...255).

Function:	Value transmitter (temperature value transmitter)				
Object	Function	Name	Type	DPT	Flag
18, 19, 20	Temperature value	Extension input 1...3 - output	2 byte	9.001	C, -, T [1]

Description: 2-byte object for transmission of temperature value telegrams (0 °C...40 °C).

Function:	Value transmitter (brightness value transmitter)				
Object	Function	Name	Type	DPT	Flag
18, 19, 20	Brightness value	Extension input 1...3 - output	2 byte	9.004	C, -, T [1]

Description: 2-byte object for transmission of brightness value telegrams (0 Lux...1,500 Lux).

Function:	Value transmitter (light scene extension)				
Object	Function	Name	Type	DPT	Flag
18, 19, 20	Light scene extension	Extension input 1...3 - output	1 byte	18.001	C, -, T [1]

Description: 1-byte object for opening or saving light scenes (1...64).

Function:	Disabling function				
Object	Function	Name	Type	DPT	Flag
24, 25, 26	Disabling switching object X.1	Extension input 1...3 - input	1-bit	1.003	C, W, - [2]

Description: 1-bit object for disabling the first switching object of an extension input (polarity configurable).
Only for the "Switching" function!

Function:	Disabling function				
Object	Function	Name	Type	DPT	Flag
27, 28, 29	Disabling switching object X.2	Extension input 1...3 - input	1-bit	1.003	C, W, - [2]

Description: 1-bit object for disabling the second switching object of an extension input (polarity configurable).
Only for the "Switching" function!

1: Each communication object can be read out. For reading, the R-flag must be set.

2: For reading, the R-flag must be set. The last value written to the object via the bus will be read.

Function: Disabling function

Object	Function	Name	Type	DPT	Flag
24, 25, 26	Disabling	Extension input 1...3 - input	1-bit	1.003	C, W, - [1]

Description 1-bit object for disabling an extension input (polarity configurable).
Only for the "Dimming", "Venetian blind" and "Value transmitter" functions.

1: For reading, the R-flag must be set. The last value written to the object via the bus will be read.

4.2.4 Functional description

4.2.4.1 Push-button (PB)

The KNX rotary sensor combines the functions of a push-button sensor with extension connection and a bus coupling unit in a single device. The KNX rotary sensor follows the familiar operation concept of a press/rotary dimmer with incremental encoder. The rotary knob serves as a rocker function (turn to the left <-> turn to the right, e.g. dimming), the push-button serves as a push-button function (e.g. switching). The function of the rotary knob can be combined with the function of the push-button or can be operated independently of it, too.

The following section contains descriptions of the various functions that can be configured in the ETS for the push-button.

4.2.4.1.1 Push-button function Switching

If the push-button is set to the "Switching" function, the ETS indicates a 1-bit communication object. Using the parameters, it is possible to determine which switching command this object is to adopt on pressing and / or on releasing (no reaction, ON, OFF, TOGGLE – toggling of the object value). No distinction is made between a brief or long press.

4.2.4.1.2 Push-button function Dimming

If the push-button is set to the "Dimming" function, the ETS indicates a 1-bit object and a 4-bit object. Generally, the device transmits a switching telegram after a brief press and a dimming telegram after a long press. In the standard configuration, a telegram for stopping the dimming process is transmitted when releasing the push-button after a long press. The time needed by the device to detect an actuation as a long actuation can be set in the parameters.

Single-surface and double-surface operation in the dimming function
In the standard setting, the single-surface dimming function is preset in the ETS. In this mode, the device transmits ON and OFF telegrams in an alternating pattern ("TOGGLE") on each brief press. After a long press, the "brighter" and "darker" telegrams are transmitted in an alternating pattern. The parameter "Command on pressing the button" defines the single-surface or double-surface dimming function.

i If the addressed actuator can be controlled from control sections, a faultless single-surface operation requires that the actuator returns its switching state to the 1-bit object of the push-button. In addition, the 4-bit objects of the control sections must be interconnected via an identical group address. Otherwise, the operating function of the push-button would not be able to detect if the actuator had been controlled from another control section.

Advanced parameters
The push-button has advanced parameters for the dimming function which are hidden in the standard view for greater clarity. If necessary, these advanced parameters can be activated and thus be made visible.
The advanced parameters can be used to determine whether the push-button sensor is to cover the full adjusting range of the actuator with one dimming telegram continuously ("Increase brightness by 100 %", "Reduce brightness by 100 %") or whether the dimming process is to be divided into several small levels (50 %, 25 %, 12.5 %, 6 %, 3 %, 1.5 %).
In the continuous dimming mode (100%), the device transmits a telegram only at the beginning of a long press to start the dimming process and generally a stop telegram after the end of the press. For dimming in small levels it may be useful if the device repeats the dimming telegram in case of a sustained press for a presettable time (parameter "Telegram repetition"). The stop telegram after the end of the press is then not needed.
When the parameters are hidden ("Advanced parameters = deactivated"), the dimming range is set to 100 %, the stop telegram is activated and the telegram repetition is deactivated.

4.2.4.1.3 Push-button function Venetian blind

If the push-button is set to "Venetian blind", the ETS indicates the two 1-bit objects "Short-time operation" and "Long-time operation". The long-time operation (long button-press) is used to move a Venetian blind, rolling shutter or awning until the end position as required. The short-time operation (brief press) is normally used to stop the long-time operation whereby any blind/shutter position can be adjusted. Alternatively, the short-time operation can be used to adjust the slat angle of a Venetian blind or the slit position of a rolling shutter. The operation concept of the blind function defines how exact the time sequence of the telegrams is.

Operation concept for the Venetian blind function
For the control of Venetian blind, roller shutter, awning or similar drives, the device supports four operation concepts for the push-button in which the telegrams are transmitted in different time sequences. Therefore a wide variety of drive configurations can be operate with the push-button.
The different operation concepts are described in detail in the following chapter.

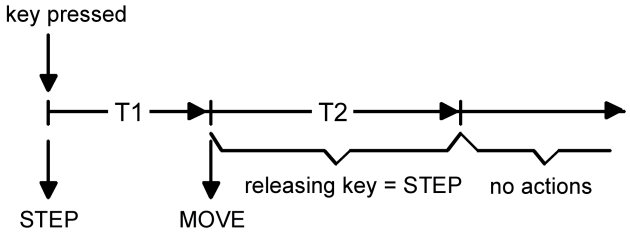

Figure 4: Operation concept "short – long – short"

Operation concept "short - long – short":
In the operation concept "short – long – short", the push-button shows the following behaviour:

- Immediately on pressing the button, the device transmits a short time telegram. Pressing the button stops a running drive and starts time T1 ("time between short time and long time command"). No other telegram will be transmitted, if the key is released within T1. This short time serves the purpose of stopping a continuous movement.
  The "time between short time and long time command" of the push-button should be selected shorter than the short time operation of the actuator to prevent a jerky movement of the blind.
- If the button is kept depressed longer than T1, the device transmits a long time telegram after the end of T1 for starting up the drive and time T2 ("slat adjusting time") is started.
- If the button is released within the slat adjusting time, the device sends another short time telegram. This function is used for adjusting the slats of a blind. The function permits stopping the slats in any position during their rotation.
  The "slat adjusting time" should be chosen as required by the drive for a complete rotation of the slats. If the "slat adjusting time" is selected longer than the complete running time of the drive, a push button function is possible as well. This means that the drive is active only when the button is kept depressed.
- If the button is kept depressed longer than T2, the device transmits no further telegram. The drive remains on until the end position is reached.

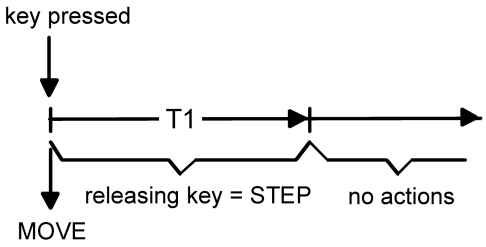

Figure 5: Operation concept "long – short"

Operation concept "long – short":
In the operation concept "short – long", the push-button shows the following behaviour:

- Immediately on pressing the button, the device transmits a long time telegram. The drive begins to move and time T1 ("slat adjusting time") is started.
- If the button is released within the slat adjusting time, the device sends a short time telegram. This function is used for adjusting the slats of a blind. The function permits stopping the slats in any position during their rotation.
  The "slat adjusting time" should be chosen as required by the drive for a complete rotation of the slats. If the "slat adjusting time" is selected longer than the complete running time of the drive, a push button function is possible as well. This means that the drive is active only when the button is kept depressed.
- If the button is kept depressed longer than T1, the device transmits no further telegram. The drive remains on until the end position is reached.

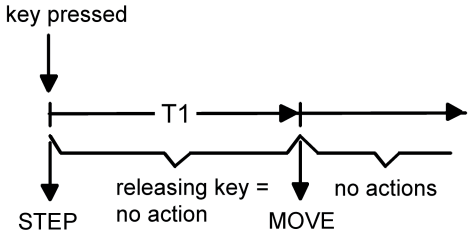

Figure 6: Operation concept "short – long"

Operation concept "short – long":
In the operation concept "long – short", the push-button shows the following behaviour:

- Immediately on pressing the button, the device transmits a short time telegram. Pressing the button stops a running drive and starts time T1 ("time between short time and long time command"). No other telegram will be transmitted, if the key is released within T1. This short time serves the purpose of stopping a continuous movement.
  The "time between short time and long time command" of the push-button should be selected shorter than the short time operation of the actuator to prevent a jerky movement of the blind.
- If the button is kept depressed longer than T1, the device transmits a long time telegram after the end of T1 for starting the drive.
- No further telegram is transmitted by the device when the button is released. The drive remains on until the end position is reached.

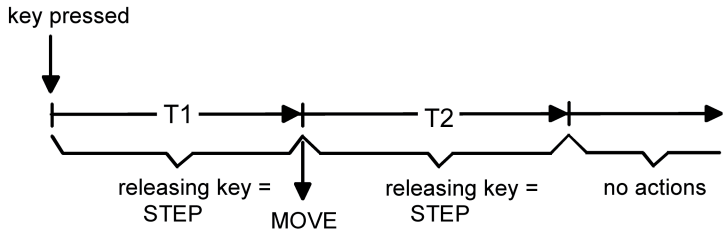

Figure 7: Operation concept "long – short or short"

Operation concept "long – short or short":
In the operation concept "long – short or short", the push-button shows the following behaviour:

- Immediately on pressing the button, the device starts time T1 ("time between short time and long time command") and waits. If the button is released again before T1 has elapsed, the device transmits a short time telegram. This telegram can be used to stop a running drive. A stationary drive rotates the slats by one level.
- If the button is kept depressed after T1 has elapsed, the device transmits a long time telegram and starts time T2 ("slat adjusting time").
- If the button is released within T2, the device sends another short time telegram. This function is used for adjusting the slats of a blind. The function permits stopping the slats in any position during their rotation.
  The "slat adjusting time" should be chosen as required by the drive for a complete rotation of the slats. If the "slat adjusting time" is selected longer than the complete running time of the drive, a push button function is possible as well. This means that the drive is active only when the button is kept depressed.
- If the button is kept depressed longer than T2, the device transmits no further telegram. The drive remains on until the end position is reached.

Single and double-surface Venetian blind function
The single-surface blind function is preset on the push-button. In this case, the device alternates between the directions of the long time telegram (TOGGLE) on each long actuation of the sensor. Several short time telegrams in succession have the same direction. The parameter "Command on pressing the button" defines the single-surface or double-surface blind function. If the addressed actuator can be controlled from several control sections, a faultless single-surface actuation requires that the long time objects of the control sections sensors are interlinked. Otherwise, the control section of the push-button would not be able to detect if the actuator had been controlled from another control section.

4.2.4.1.4 Push-button function value transmitter

If the function is set to the function "1-byte value transmitter" or "2-byte value transmitter" the ETS indicates a corresponding object. On the press of a button, the configured value or the value last stored internally by a value change (see below) will be transmitted to the bus.

Value ranges
The "Function" parameter determines the value range used by the push-button. As a 1-byte value transmitter, the device can optionally transmit integers from 0 … 255 or relative values within a range of 0 … 100 % (e.g. as dimming value transmitter). As a 2-byte value transmitter, the device optionally transmits integers from 0 … 65535, temperature values within a range of 0 … 40 °C or brightness values from 0 … 1500 lux. The value that can be transmitted to the bus by an actuation of a button can be configured for each of these ranges.

Adjustment by means of long button-press
If the value adjustment feature has been enabled in the ETS, the push-button must be kept pressed for more than five seconds in order to vary the current value of the value transmitter. The value adjustment function continues to be active until the button is released again. In a value adjustment, the device distinguishes between the following options...

- The "Starting value in case of value adjustment" parameter defines the original starting value for the adjustment. Adjustment can begin from the value configured in the ETS, from the final value of the last adjustment cycle or from the current value of the communication object, with the last option not being available for the temperature and brightness value transmitter.
- The parameter "Direction of value adjustment" defines whether the values will always be increased ("upwards"), always reduced ("downwards") or alternately increased and reduced ("toggling").
- For the value transmitters 0 … 255, 0 … 100 % and 0 … 65535, the "step width" by which the current value is to be changed during the value adjustment can be specified. In case of the temperature and the brightness value transmitter, the step width specifications (1 °C and 50 lux) are fixed.
- The parameter "Time between two telegrams" can be used in connection with the step width to define the time required to cycle through the full respective value range. This value defines the time span between two value transmissions.
- If, during the value adjustment, the device detects that the preset step width would have to exceed the limits with the next telegram, the device adapts the step width once in such a way that the corresponding limit value is transmitted together with the last telegram. Depending on the setting of the parameter "Value adjustment with overflow ?" the device stops the adjustment at this point or inserts a pause consisting of two levels and then continues the adjustment beginning with the other limit value.

	Function	Limit value lower	Limit value upper
1-byte value transmitter	0...255	0	255
1-byte value transmitter	0...100 %	0 % (value = 0)	100 % (value = 255)
2-byte value transmitter	0...65535	0	65535
2-byte value transmitter	Temperature value	0 °C	40 °C
2-byte value transmitter	Brightness value	0 lux	1.500 lux

Value range limits for the different value transmitters

i During a value adjustment, the newly adjusted values are only in the volatile RAM memory of the extension module. Therefore, the stored values are replaced by the preset values programmed in the ETS when a reset occurs (bus voltage failure or ETS programming).

With the 1-byte value transmitter in the "Value transmitter 0…100 %" function, the step width of the adjustment will also be indicated in "%". If the starting value of the communication object is used, it may happen in this case during value adjustment that the value last received via the object must be rounded and adapted before a new value can be calculated on the basis of the step width and transmitted. Due to the computation procedure used, the new calculation of the value may be slightly inaccurate.

Value adjustment examples

- Value transmitter 1-byte (all other value transmitters identical)
- Function = value transmitter 0…255
- Value configured in the ETS (0...255) = 227
- Step width (1...10) = 5
- Start on value adjustment = same as configured value
- Direction of value adjustment = toggling (alternating)
- Time between two telegrams = 0.5 s

Example 1: Value adjustment with overflow? = No

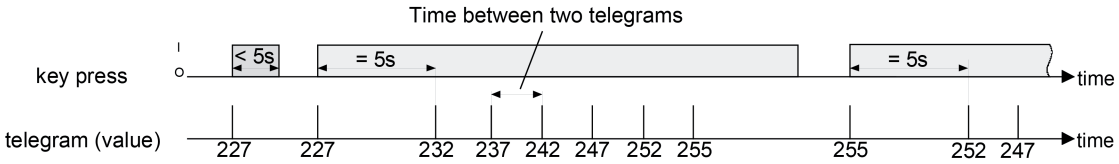

Figure 8: Example of value adjustment without value range overflow

Example 2: Value adjustment with overflow? = Yes

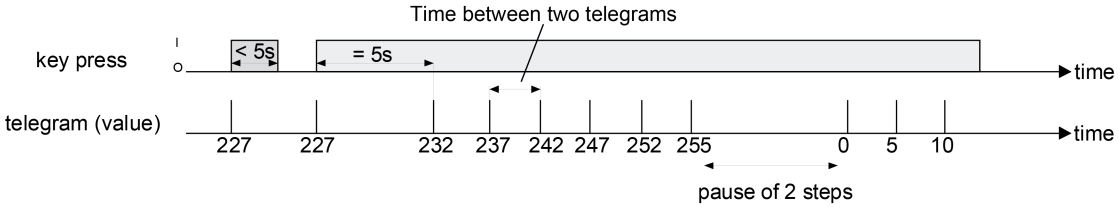

Figure 9: Example of value adjustment with value range overflow

4.2.4.1.5 Push-button function Scene extension

The ETS indicates the "Function" parameter if the function of the push-button is set to "scene extension". A distinction is then made between the following settings…

- "Scene extension without storage function",
- "Scene extension with storage function",

In the scene extension function, the device transmits a preset scene number (1…64) via a separate communication object to the bus after a button-press. This feature permits recalling scenes stored in other devices and also storing them, if the storage function is used.
In the setting "Scene extension without storage function", a button-press triggers the simple recall of a scene. A long button-press has no further or additional effect.
In the setting "Scene extension with storage function", the device monitors the length of the actuation. A button-press of less than a second results in a simple recall of the scene as mentioned above. After a button-press of more than five seconds, the device generates a storage instruction whereby a storage telegram is transmitted to the bus. An operation lasting between one and five seconds will be discarded as invalid.

The parameter "Scene number specifies which of the maximum of 64 external scenes is to be activated after a button-press.

4.2.4.1.6 Push-button function 2-channel operation

In some situations it is desirable to control two different functions with a single button-press and to transmit different telegrams, i.e. to operate two function channels at a time. This is possible with the "2-channel operation" function.

For both channels, the parameters "Function channel 1" and "Function channel 2" can be used to determine the communication object types to be used. The following types are available for selection…

- Switching (1 bit)
- Value transmitter 0 … 255 (1-byte)
- Value transmitter 0 … 100 % (1-byte)
- Temperature value transmitter (2 bytes)

The object value the device is to transmit on a button-press can be selected depending on the selected object type. With "Switching (1 bit)", it is possible to select whether an ON or an OFF telegram is transmitted on the press of a button. Alternatively, the object value can be switched over (TOGGLE) and transmitted. The configuration as "Value transmitter 0 … 255 (1 byte)" or as "Value transmitter 0 … 100 % (1 byte)" permits entering the object value freely within a range from 0 to 255 or from 0% to 100%. The "Temperature value transmitter (2 bytes)" permits selecting a temperature value between 0°C and 40°C.
In this case, the adjustment of the object value on a long button-press is not possible as the determination of the actuation length is needed for the adjustable operation concepts.

Unlike the other functions of the push-button, it is possible for the device buzzer to execute the function "Telegram acknowledgement". Here, an acoustic signal sounds for approx. 250 ms each time a telegram is transmitted (see page 88).

Operation concept channel 1 or channel 2
In this operation concept, exactly one telegram will be transmitted on each press of a button.

- On a brief press the device transmits the telegram for channel 1.
- On a long press the device transmits the telegram for channel 2.

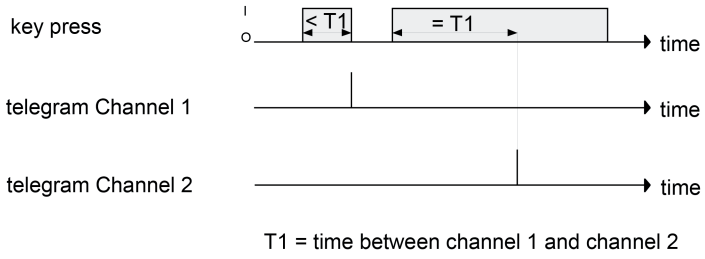

Figure 10: Example of operation concept "Channel 1 or Channel 2"

The time required for distinguishing between a short and a long operation is defined by the parameter "Time between channel 1 and channel 2". If the button is pressed for less than the configured time, only the telegram to channel 1 is transmitted. If the length of the button-press exceeds the time between channel 1 and channel 2, only the telegram to channel 2 will be transmitted. This concept provides the transmission of only one channel. To indicate that a telegram has been transmitted, the device buzzer outputs a tone for approx. 250 ms in the "Telegram acknowledgement" setting.

Operation concept channel 1 and channel 2
With this operation concept, one or alternatively two telegrams can be transmitted on each button-press.

- On a brief press the device transmits the telegram for channel 1.
- A long press causes the device to transmit first the telegram for channel 1 and then the telegram for channel 2.

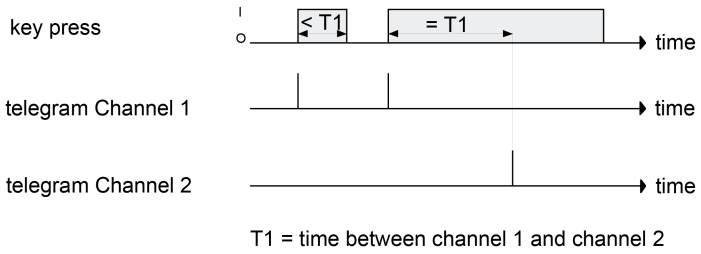

Figure 11: Example for operation concept "Channel 1 and channel 2"

The time required for distinguishing between a short and a long operation is defined by the parameter "Time between channel 1 and channel 2". In this operation concept, a button-press sends this telegram is immediately to channel 1. If the button is held depressed for the configured time, the telegram for the second channel is transmitted as well. If the button is released before the time has elapsed, no further telegram will be transmitted. With this operation concept, it is also possible to signal the transmission of a telegram by the buzzer (setting "Telegram acknowledgement").

4.2.4.2 Rotary knob (RK)

4.2.4.2.1 Rotary knob function Switching

The rotary function "Switching" allows 1-bit switching telegrams to be transmitted to the bus in order to activate a lighting system, for example. Depending on the movement of the rotary knob (clockwise or anticlockwise), different control commands (ON, OFF, TOGGLE) can be transmitted to the bus via a communication object (Figure 12). Alternatively, separate objects can be assigned to both directions of rotation thereby enabling two different actuation channels to be activated with just one operating element (Figure 13).

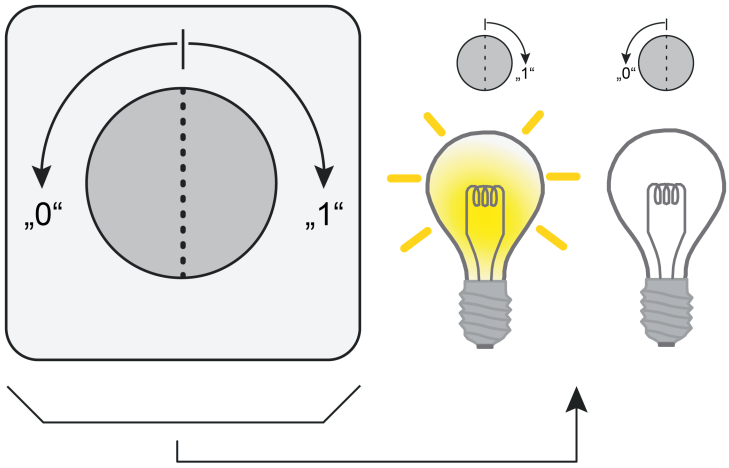

Figure 12: Example of rotary knob function "Switching" (here: switching light)
one object for both directions of rotation

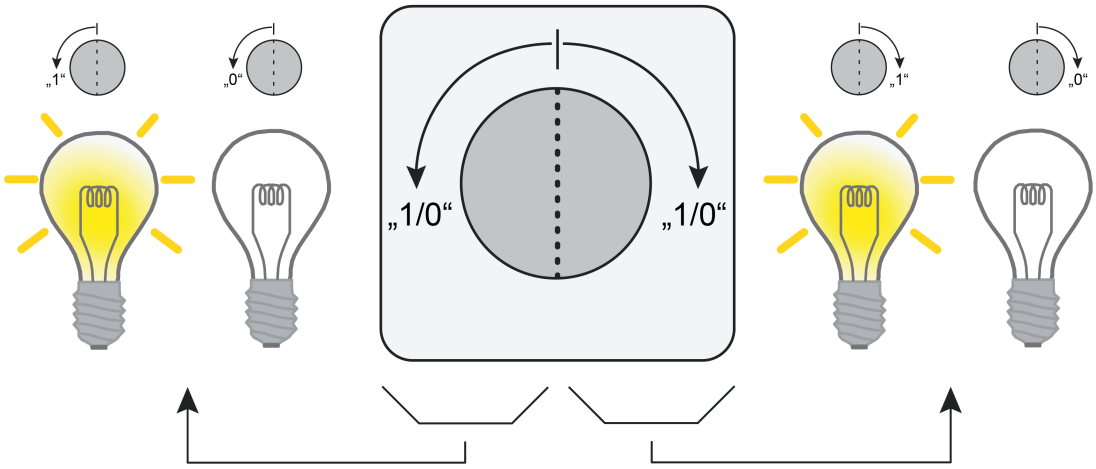

Figure 13: Example of rotary knob function "Switching" (here: switching light)
separate objects for the directions of rotation

When operating the rotary knob, a switching telegram with the command according to the ETS configuration is already transmitted after the first notch (minimum rotation angle) depending on the direction of rotation (Figure 14).

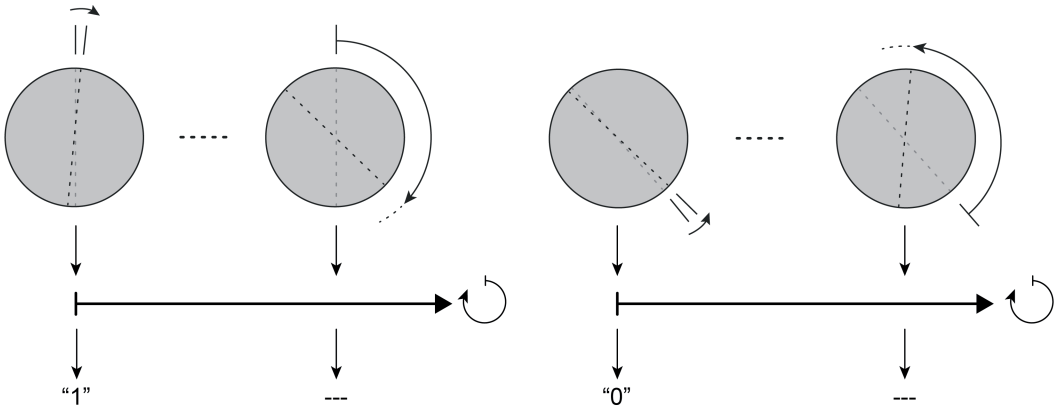

Figure 14: Example of the operation concept of the Rotary knob function "Switching"
(here: turning clockwise = ON / turning anticlockwise = OFF)

The rotary sensor differentiates between different operations (e.g. switching on, afterwards switching off) based upon the time that the rotary knob stands still after a completed operation. The "Time for standstill after each movement" is configured in the ETS and should not be selected too short in order to avoid unintended switching operations - particularly during fast operations. If the device detects additional operations immediately after a rotary movement (time not yet elapsed), it then ignores the continuing movement of the rotary knob. The time for standstill detection is retriggered for each rotary knob movement.

i If the direction of rotation changes without interruption during an operation, the rotary knob does not transmit any further telegram. The device evaluates this operation as a wrong operation.

i

i The rotation angle (number of notches during a rotary movement) and the speed of rotation have no significance for the function "Switching". During a new operation, a telegram is already transmitted to the bus after the first notch (minimum rotation angle).

4.2.4.2.2 Rotary knob function Dimming

When using the rotary knob function "Dimming", it is possible to dim or optionally switch lighting systems by activating dimmer actuators. Likewise, KNX speed controllers can be addressed whereby motors can be switched on and off and the speed changed. The direction of the rotary knob movement (clockwise or anticlockwise) specifies the switching and dimming command (lighter ON / darker OFF).

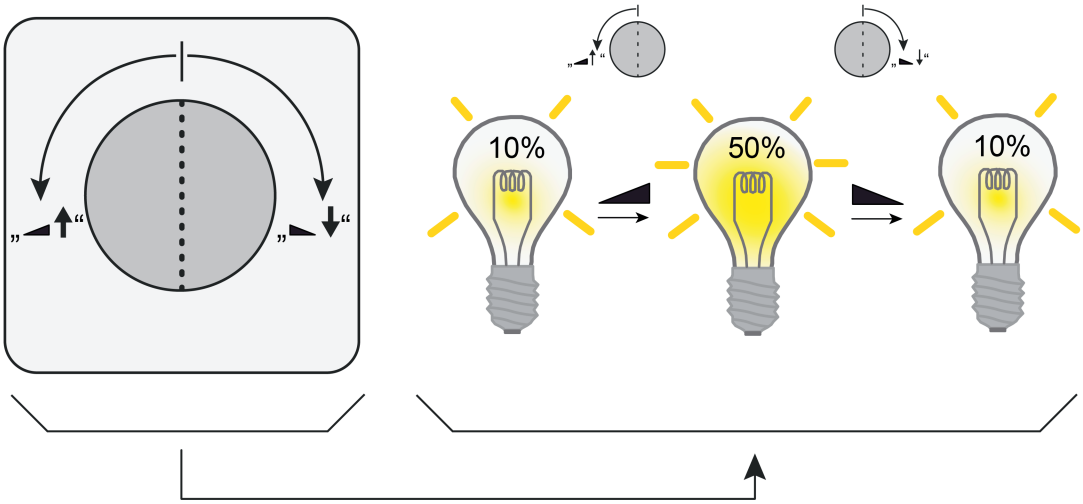

Figure 15: Example of rotary knob function "Dimming"
(here: dimming in the brightness range)

The rotary knob function "Dimming" differentiates between four different operation concepts...

- Dimming without OFF telegram
  This operation concept only outputs relative dimming commands with a step width of 100% during a rotary knob movement. Stop telegrams stop a dimming process at the end of the operation. It is thus possible to set any brightness values of a lighting system, for example. Switching telegrams are not transmitted by the rotary knob to the actuator in this configuration. For this reason, it is possible to combine the rotary knob operation concept "Dimming without OFF telegram" with the push-button function "Switching", whereby a dimmer actuator can be dimmed (rotary knob movement) as well as switched (push-button operation).
- Dimming with OFF telegram
  This operation concept functions in the dimming process just like the concept "Dimming without OFF telegram", the only difference being that the device can also switch off the activated actuator by means of a rotary knob operation. Since this operation concept performs switching and dimming, it can be used autonomously without any additional operating elements. Hence, the push-button in this case, can be configured for another control function.
- Dimming Comfort without OFF telegram
  This operation concept supports the operation of the rotary knob for dimming dependent on speed and rotation angle. Here, depending on the speed of rotation, relative dimming is possible by small and large step widths, thereby allowing the brightness of a lighting system to be set finely and gradually.
  Switching telegrams are not transmitted by the rotary knob to the actuator in this concept. For this reason, it is possible to combine the rotary knob operation concept "Dimming Comfort without OFF telegram" with the push-button function "Switching", whereby a dimmer actuator can be dimmed (rotary knob movement) as well as switched (push-button operation).

- Dimming Comfort with OFF telegram
  This operation concept functions in the dimming process just like the concept "Dimming Comfort without OFF telegram", the only difference being that the device can also switch off the activated actuator by means of a rotary knob operation. Since this operation concept performs switching and dimming, it can be used autonomously without any additional operating elements. Hence, the push-button in this case, can be configured for another control function.

The rotary sensor differentiates between different operations (e.g. switching dimming brighter, afterwards dimming darker or STOP / faster or slower operation for the operation concepts "Dimming Comfort...") based upon the time that the rotary knob stands still after a completed operation. The "Time for standstill after each movement" is configured in the ETS and should not be selected too short in order to avoid unintended control operations - particularly during fast operations. If the device detects additional operations immediately after a rotary movement (time not yet elapsed), it evaluates the continuing movement of the rotary knob and executes further reactions as described if necessary. The time for standstill detection is retriggered for each rotary knob movement.

Dimming without OFF telegram

When operating the rotary knob, a 4-bit dimming telegram (relative dimming) with a step width of 100 % is already transmitted after the first notch (minimum rotation angle) with this operation concept. By using the maximum dimming step width, the entire brightness range can be operated. The direction of rotation specifies the dimming command (Brighter / Darker). As soon as the rotary knob is no longer operated, the device transmits a stop telegram after the configurable "Time for standstill after each operation" in the ETS has elapsed, which stops the dimming process.
This operation concept only outputs relative dimming commands. Thus, only a 4-bit communication object is available. Switching telegrams are not transmitted by the rotary knob to the actuator in this configuration.

i If the direction of rotation changes without a break during an operation, the rotary knob immediately transmits a stop telegram to the bus. The device evaluates this operation as a wrong operation and thus transmits no further telegram at the end of the rotary movement.

i The rotation angle (number of notches during a rotary movement) and the speed of rotation is not evaluated by the device in the operation concept "Dimming without OFF telegram".

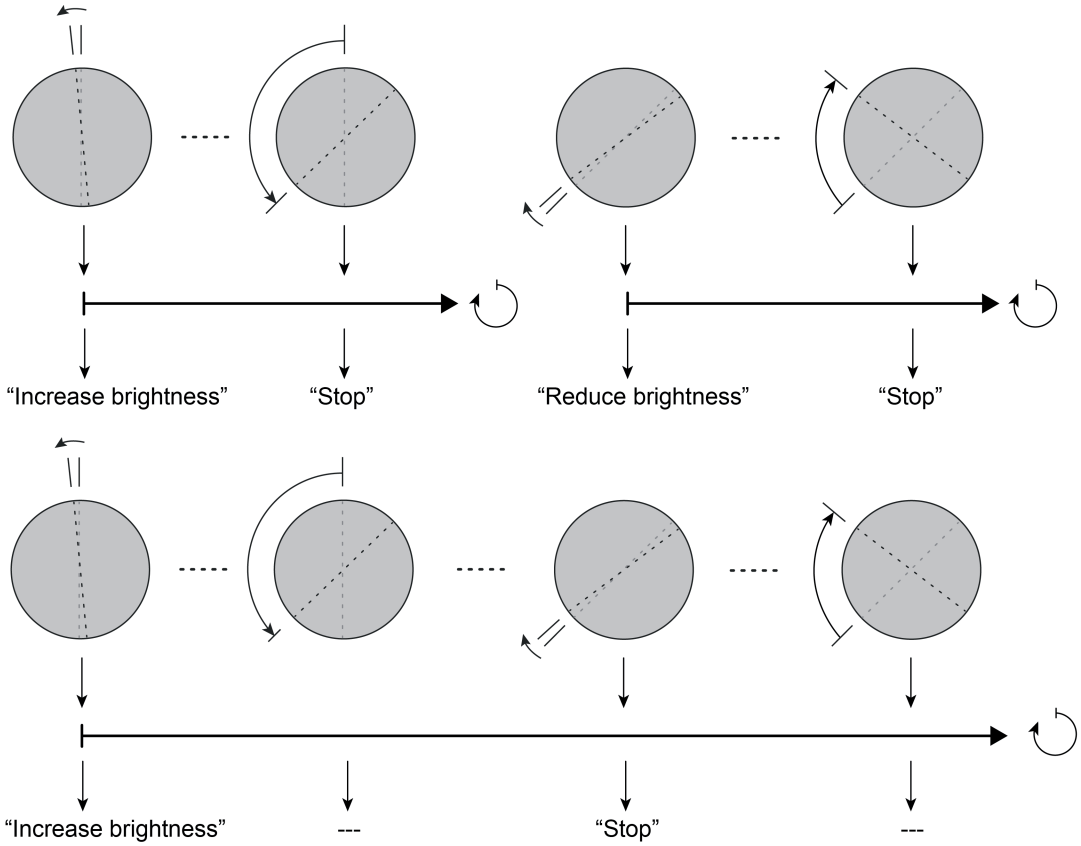

Figure 16: Example of the operation concept of the Rotary knob function "Venetian blind" in the operation concept "Dimming without OFF telegram"
top: Stop telegram after each of the completed control operations
bottom: Stop telegram by changing the direction of rotation (wrong operation)

Dimming with OFF telegram

This operation concept functions in the dimming process just like the concept "Dimming without OFF telegram", the only difference being that the device can also switch off the activated actuator by means of a rotary knob operation. For this purpose, the rotary knob evaluates a brightness value feedback of the dimmer actuator. If the dimmer actuator returns basic brightness (brightness value = "1", "2" or "3"), it was set to the lowest possible brightness. The rotary knob then transmits a switch-off telegram immediately to the actuator with the command "darker OFF" during the next control operation. This is repeated for each subsequent dimming command "darker - OFF" until the dimmer actuator feedback changes. If dimming occurs in the opposite direction ("brighter - ON"), the rotary knob transmits a relative dimming telegram to the bus so that the dimmer actuator switches on.
The rotary knob has two additional communication objects in this operation concept: The 1-byte object "Feedback brightness value" of the rotary knob is to be connected to the 1-byte brightness feedback of the activated dimmer actuator. The actuator must actively transmit the brightness value on change. Only one actuator may ever be linked to the brightness object of the rotary knob. The rotary knob also transmits an OFF telegram to the dimmer actuator during an operation ("Darker - OFF") if the last returned brightness value is "0" (OFF after OFF = no change). The 1-bit object "Switching" must be linked to the switching object of the actuator.

- Switching off by the rotary knob is not possible if the activated dimmer actuator never returns basic brightness. This is the case, if dimmer actuators work with a minimum brightness greater than 0%. In such cases, the dimmable brightness range at the lower limit is normally limited to values greater than basic brightness (e.g. minimum settable brightness = 10%). The operation concept "Dimming with OFF - telegram" cannot be used if the activated dimmer actuator works with a minimum brightness greater than 0%!
- The rotary knob never transmits any ON telegrams via the switching object. This is not necessary because dimmer actuators normally switch on automatically as soon as they receive a dimming telegram "increase brightness" in the "OFF" state. With some actuators it may be necessary to activate the automatic switch-on in the configuration when increasing brightness.
- If the direction of rotation changes without a break during an operation, the rotary knob immediately transmits a stop telegram to the bus. The device evaluates this operation as a wrong operation and thus transmits no further telegram at the end of the rotary movement.
- After a device reset (bus voltage return or ETS programming operation), the value of the brightness feedback object is first "0". A feedback ">3" must first be received so that a brightness can be decreased.
- The rotation angle (number of notches during a rotary movement) and the speed of rotation is not evaluated by the device in the operation concept "Dimming with OFF telegram".

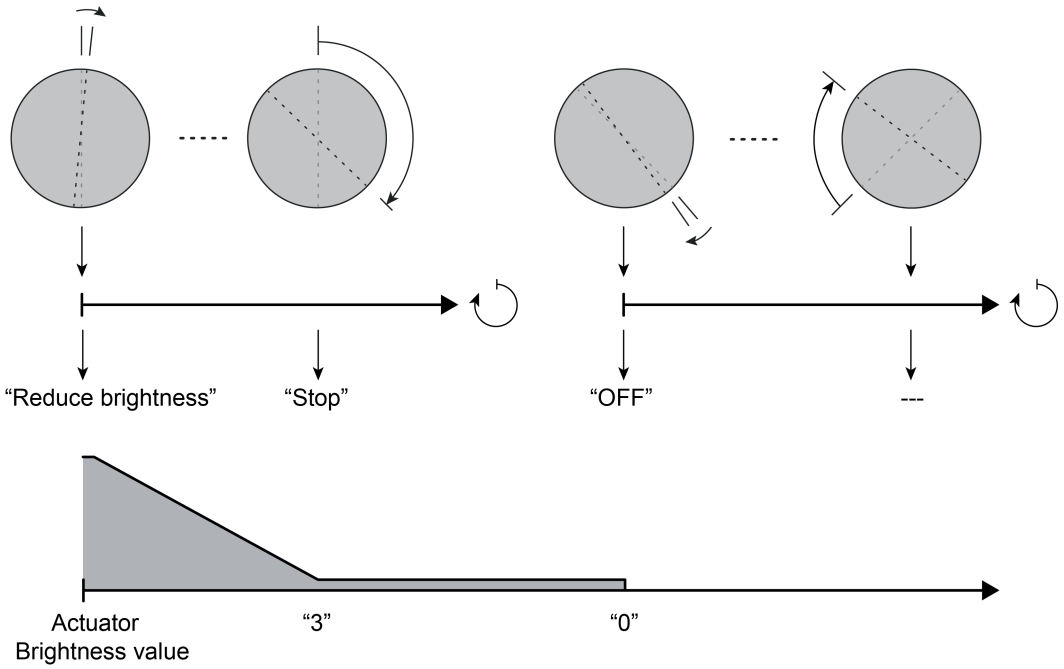

Figure 17: Example of the operation concept of the Rotary knob function "Venetian blind" in the operation concept "Dimming with OFF telegram"

- The behaviour of the device when increasing brightness is identical to the operation concept "Dimming without OFF telegram" (Figure 16). For this reason, the figure for the operation concept "Dimming with OFF telegram" only shows decreasing brightness and switching off.

Dimming Comfort without OFF telegram

This operation concept allows the operation of the rotary knob dependent on speed and rotation angle in order to transmit relative dimming commands. Here, depending on the speed of rotation, relative dimming is possible by small and large step widths, thereby allowing the brightness of a lighting system to conveniently be set finely and gradually during fast rotary

movements as well as during large changes. During a fast rotary movement, the size of the dimming step width is also specified by the rotation angle. The direction of rotation - as in the other operation concepts for dimming, too - specifies the dimming command (Brighter / Darker).

During a slow operation (notch by notch), the rotary knob transmits dimming commands to the actuator in a small step width. This step width is configured in the ETS (1.5 %, 3 %, 6 %). The activated dimmer actuator receives the relative dimming command and controls, for example, the brightness of the connected lighting system each time a new telegram is transmitted, i.e. by one notch slightly brighter or slightly darker during each adjustment of the rotary knob.
In contrast to this, a fast operation causes a significant change in brightness by the rotary knob transmitting greater dimming step widths to the actuator. The size of the step width is determined by the rotation angle by which the rotary knob is turned within the operation time. The table below shows the dimming step widths depending on the rotation angle during a fast rotary knob operation...

Rotation angle (rotation in segment)	relative dimming step width
45° (1/8 rotation)	12.5 %
90° (1/4 rotation)	25 %
180° (1/2 rotation)	50 %
360° (1/1 rotation)	100 %

Dimming step widths depending on the rotation angle during a fast rotary knob operation

The rotation angle is interpreted by segments. Regardless of where the rotary knob operation starts, relative dimming telegrams are transmitted incrementally to the bus depending on the segments during a continuous operation (Figure 18).
At the start of each control operation, a stop telegram is always transmitted to the bus to be able to stop the dimming process as well. If the dimmer actuator is in a dimming process at the start of a control operation, this will be aborted immediately by the stop telegram. The actuator then executes the new (relative) dimming command of the rotary knob. If the actuator is not in a dimming process, the stop telegram does not cause any particular reaction. Afterwards, the dimming telegram causes the dimmer actuator to pass immediately to a new dimming process according to relative dimming presetting.

i If the direction of rotation changes without interruption during an operation, no more telegrams are transmitted continuously until the rotary knob stops. The device evaluates this operation as a wrong operation.

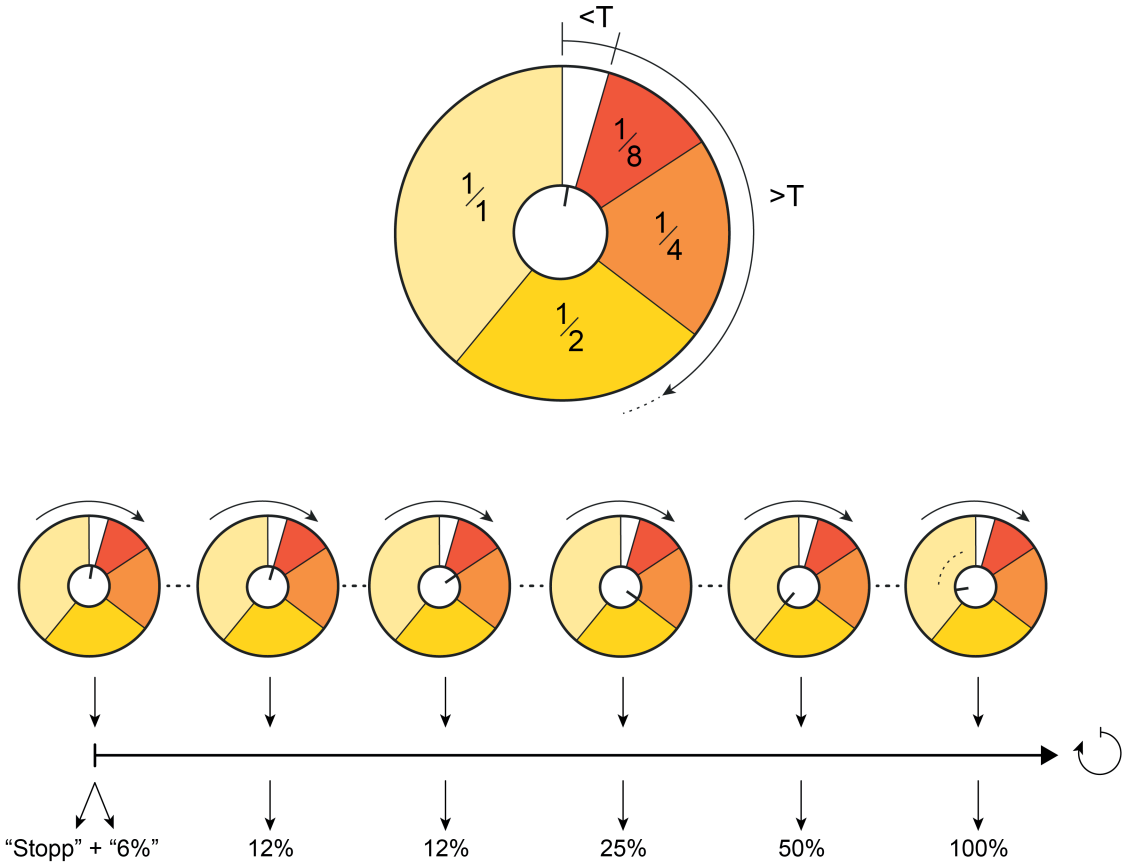

Figure 18: Rotation angle and dimming step widths in segments during a fast rotary knob operation
(here with ETS dimming step width 6 %)

T Parameter "Time for standstill after each movement"
<T slow operation: Dimming step width according to ETS parameter
>T fast operation: dimming step width dependent on rotation angle

The rotary knob distinguishes between slow and fast control operations by counting the number of notches within a time period (T). The time period is defined directly by the parameter "Time for standstill after each movement" and retriggered for each new movement. If the device counts three notches within the time period, it evaluates the control operation as fast and switches over from the fixed dimming step width according to ETS parameter to the dimming step width dependent on rotation angle. Otherwise, it is a long control operation that is retriggered and executed with each new notch.

The operation concept "Dimming Comfort without OFF telegram" only outputs relative dimming commands. Thus, only a 4-bit communication object is available. Switching telegrams are not transmitted by the rotary knob to the actuator in this configuration.

Dimming Comfort with OFF telegram

This operation concept functions in the dimming process just like the concept "Dimming Comfort without OFF telegram", the only difference being that the device can also switch off the activated actuator by means of a rotary knob operation. For this purpose, the rotary knob evaluates a brightness value feedback of the dimmer actuator. The behaviour of the device when switching off is identical to the operation concept "Dimming with OFF telegram".

We ask at this point that you refer to the descriptions of the two operation concepts mentioned above.

4.2.4.2.3 Rotary knob function Venetian blind

With the rotary knob function "Venetian blind" it is possible to activate Venetian blinds (incl. slats) and roller shutters by means of short time and long time telegrams via appropriate actuators. Similarly, other shading systems, such as roof windows, vertical slats and awnings, can also be controlled. The direction of the rotary knob movement (clockwise or anticlockwise) determines the movement direction command (raise / open slats, lower / close slats).

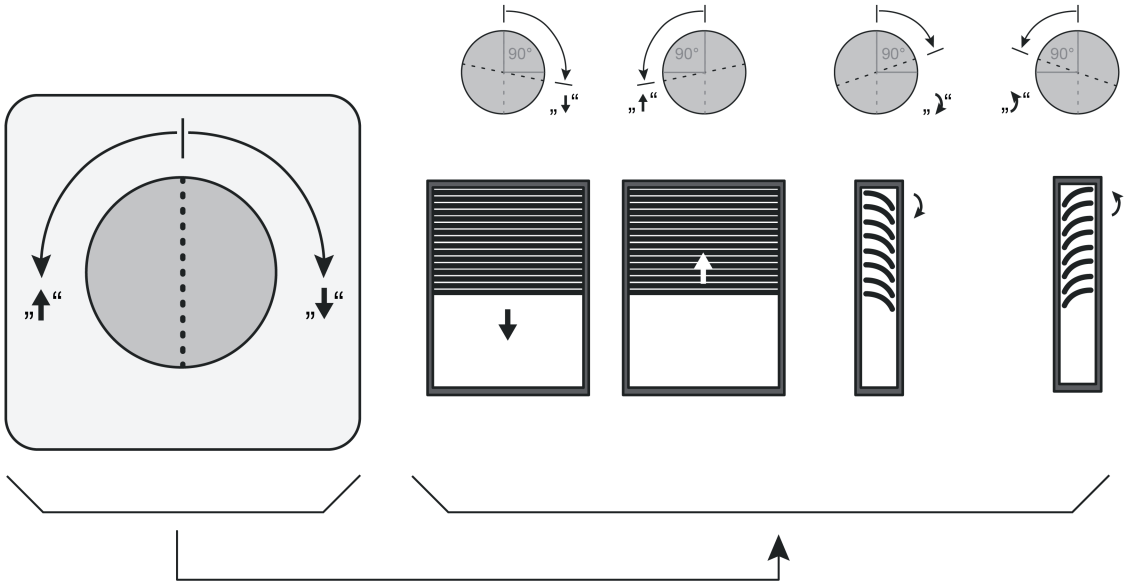

Figure 19: Example of rotary knob function "Venetian blind"
(here: Activation of a blind with slats)

In this function, the rotary knob supports the operation concept "Move - Step". Here, the rotation angle of the rotary knob (number of notches during a rotary movement) is evaluated during an operation in order to distinguish between an operation for the blind/shutter movement (MOVE, UP, DOWN) or slat adjustment (MOVE -> STEP)...

- Immediately after the first notch (minimum rotation angle) the device transmits a long time telegram (MOVE) to the bus. The drive thereby begins to move.
  If, in this case, the drive is already moving in the preset direction, no reaction takes place. The drive remains on. With a movement command in the opposite direction, the drive changes over after a short break and moves the blind/shutter in the direction that was last preset.
- If the rotary knob stops during the operation within the rotation angle preset in the ETS for a slat adjustment, the device immediately transmits a short time telegram (STEP). This function is used for adjusting the slats of a blind. This allows slats to be stopped at any position during their rotation.
  The parameter "Maximum rotation angle for slat adjustment" must be set to the expected control speed of the rotary knob and to the slat travelling time. Small angles should normally be selected if the operation is slow or the slat travelling time is short. Likewise, large angles of rotation are to be configured if the control speed is normally faster or the slat travelling time slow.
- If the operation of the rotary knob lasts longer and the maximum rotation angle for the slat adjustment is exceeded, the device transmits no STEP telegram. The drive remains on until the end position is reached.

i A movement to the end positions can be stopped (STOP) by a STEP telegram. To do this, the rotary knob can preferably be turned in the direction of rotation of the corresponding movement direction with a new operation and released within the rotation angle for the slat adjustment. An adjustment by 1-2 notches is normally clear and sufficient for the user. In this case, the device first transmits a MOVE telegram immediately after the operation. If the rotary knob stops within the rotation angle for the slat adjustment, a STEP telegram is transmitted immediately afterwards, however, whereupon the drive stops.

i If drives for rolling shutters, awnings or windows are activated by the rotary knob function "Venetian blind", i.e. slat control is unnecessary, the rotation angle for the slat adjustment should be set to the smallest angle (45°).

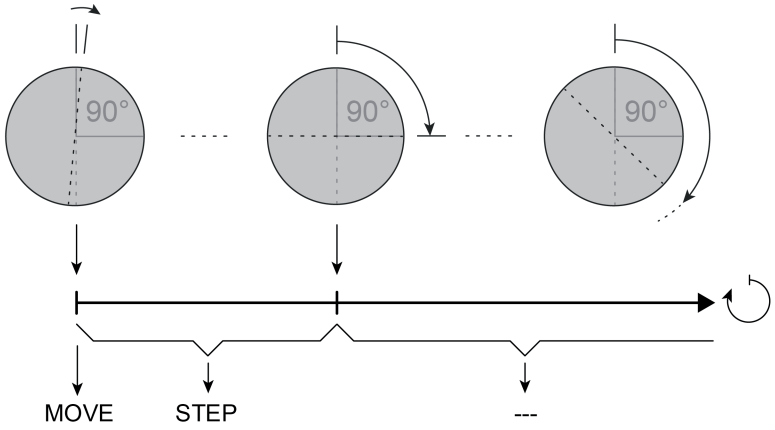

Figure 20: Example of the operation concept of the rotary knob function "Venetian blind"

i Both figures show application examples in which the parameter "Maximum rotation angle for slat adjustment" is set to "90° (1/4 rotation, 7 notches)"

The rotary sensor differentiates between different operations (e.g. lower, afterwards raise or STOP) based upon the time that the rotary knob stands still after a completed operation. The "Time for standstill after each movement" is configured in the ETS and should not be selected too short in order to avoid unintended control operations - particularly during fast operations. If the device detects additional operations immediately after a rotary movement (time not yet elapsed), it evaluates the continuing movement of the rotary knob and executes further reactions as described if necessary. The time for standstill detection is retriggered for each rotary knob movement.

i The speed of rotation is not evaluated by the device in the function "Venetian blind". During a new operation, a telegram (MOVE) is already transmitted to the bus after the first notch (minimum rotation angle).

4.2.4.2.4 Rotary knob function 1-byte value transmitter

With the rotary knob function "1-byte value transmitter" telegrams in compliance with the KNX data types 5.010 (unformatted / 0...255) and 5.001 (Scaling / 0...100%) can be transmitted to the bus. The activation of other KNX devices enables the user, for example, to make limiting value presettings or presettings for current counter statuses. Since the data format is identical, it is also possible to activate dimmer actuators more easily (via brightness value specification) or blind and shutter actuators (via position value specifications). Here - as an example - static brightness or position values can be configured and recalled by rotary knob operation. Depending on the direction of the rotary knob (clockwise or anticlockwise), different values can be transmitted to the bus via a shared communication object (Figure 21). The values can be parameterised in the ETS. It is possible optionally to make a value adjustment. In this case, only one value can be configured in the ETS for both directions of rotation, which can then be adjusted during regular operation of the device by a clockwise or anticlockwise movement (Figure 22).

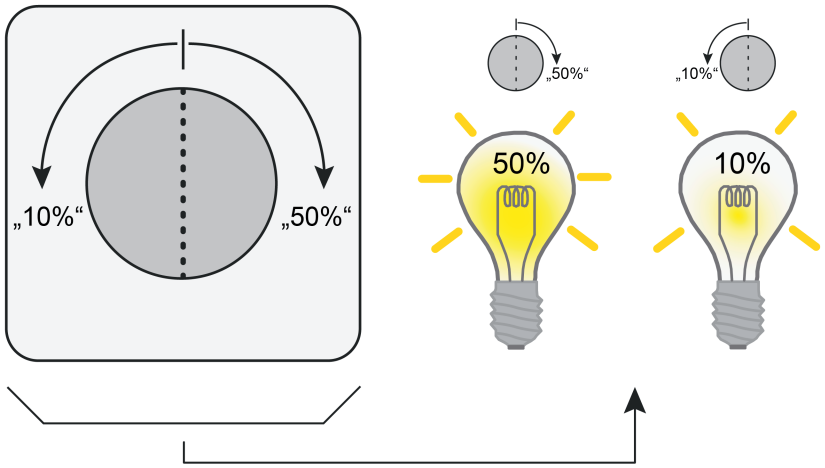

Figure 21: Example of the rotary knob function "1-byte value transmitter"
(here: lighting control / 2 discrete values without value adjustment)

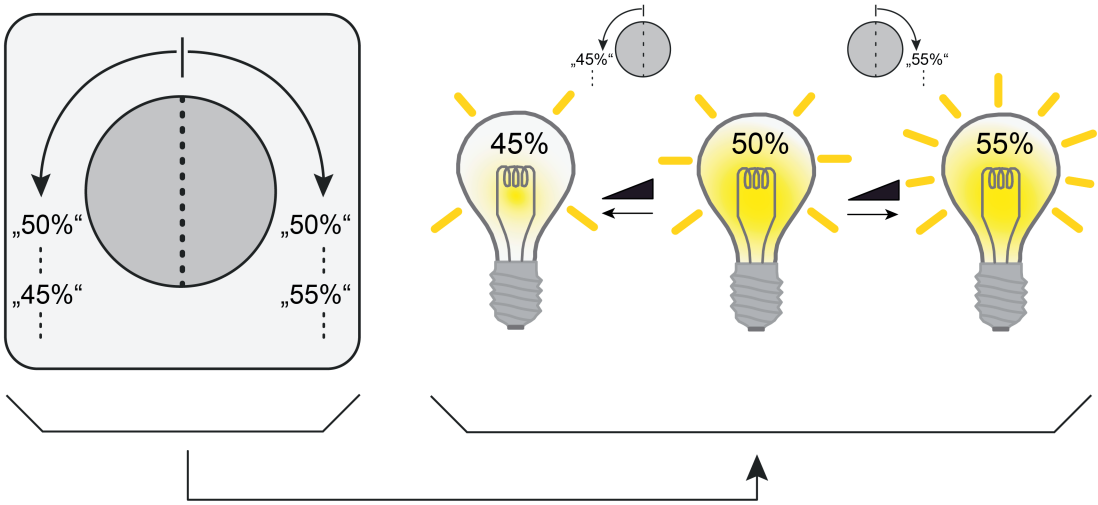

Figure 22: Example of the rotary knob function "1-byte value transmitter"
(here: lighting control / 1 value with value adjustment)

The rotary knob function "1-byte value transmitter" distinguishes three different functions...

- Value transmitter 0...255
  In this function, the rotary knob transmits unformatted values within a range of "0...255" according to the KNX data type 5.010. Such values are normally used for presettings for counter statuses or limiting values.
  Optionally, a value adjustment can be carried out by adjusting the rotary knob by a defined rotation angle.
- Value transmitter 0…100 %
  In this function, the rotary knob transmits formatted values within a range of "0...100%" according to the KNX data type 5.001. Such a value formatting in percentage is normally used for brightness value or position presettings.
  Optionally, a value adjustment can be carried out by adjusting the rotary knob by a defined rotation angle.
- Value transmitter comfort 0...255
  This function supports the operation of the rotary knob for transmitting values dependent on speed and rotation angle. Here, depending on the speed of rotation, a value adjustment is possible by small and large step widths, thereby allowing the brightness of a lighting system to be set finely and gradually. The value transmitted is normally unformatted within the value range of "0...255" according to the KNX data type 5.010 in this function.

i The only difference between the functions "value transmitter 0...255" and "value transmitter 0...100%" is the formatting of the value. The operation concepts for transmitting the values or for value adjustment are identical for these functions.

The rotary sensor differentiates between different operations (e.g. transmit value 1, afterwards value 2 / fast or slow operation in the operation concept "value transmitter comfort 0...255") based upon the time that the rotary knob stands still after a completed operation. The "Time for standstill after each movement" is configured in the ETS and should not be selected too short in order to avoid unintended control operations - particularly during fast operations. If the device detects additional operations immediately after a rotary movement (time not yet elapsed), it evaluates the continuing movement of the rotary knob and executes further reactions as described if necessary. The time for standstill detection is retriggered for each rotary knob movement.

Value transmitter 0...255 and value transmitter 0...100%

With these functions, a distinction is made as to whether just a value recall takes place and whether a value adjustment is also possible...

Function value adjustment disabled:
When operating the rotary knob, a 1-byte value telegram according to the ETS configuration is already transmitted in this case after the first notch (minimum rotation angle) depending on the direction of rotation. Different values can be preset for the clockwise or anticlockwise movements of the rotary knob (Figure 23). The values are always transmitted to the bus via the same communication object.

i If the direction of rotation changes without interruption during an operation, the rotary knob does not transmit any further telegram. The device evaluates this operation as a wrong operation.

i The rotation angle (number of notches during a rotary movement) and the speed of rotation have no significance for this function. During a new operation, a telegram is already transmitted to the bus after the first notch (minimum rotation angle).

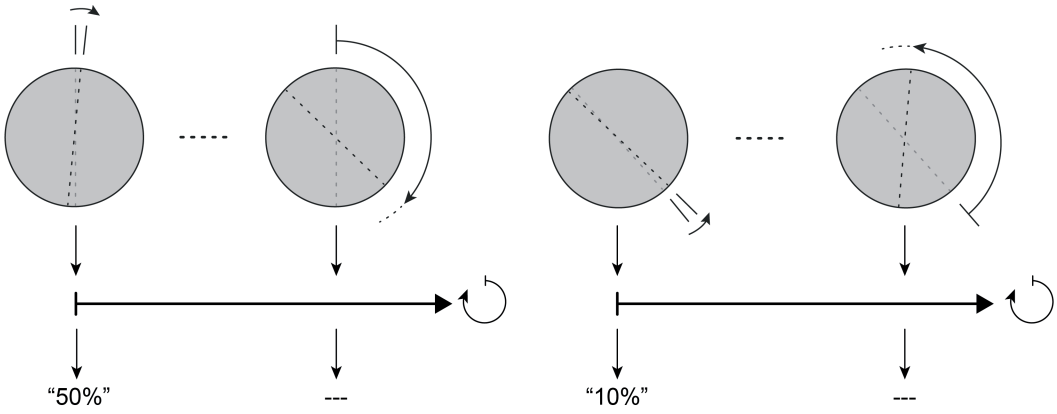

Figure 23: Example of the function "Value transmitter 0…100 %" without value adjustment ("Value transmitter 0…255" is basically the same).

Function value adjustment enabled:
If the value adjustment was enabled in the ETS, the rotary knob must be turned by a defined number of notches during an operation so that a value adjustment is executed. The parameter "rotation angle for value adjustment" defines the number of notches required for the value adjustment.
During an operation of the rotary knob - as with the value transmitter without value adjustment - a 1-byte value telegram is first transmitted after the first notch (minimum rotation angle) regardless of the direction it is turned. The parameter "Starting value in case of value adjustment" defines what value this is (see below). If the number of notches necessary for the value adjustment is exceeded during continuous operation, the device adjusts the value by the preset step width depending on the rotation direction and transmits this to the bus. If the operation still continues, the value is adjusted continuously.

- The transmission of a telegram can be acknowledged during a value adjustment the internal buzzer of the device. For this purpose, the buzzer must be configured to the signalling function "Telegram acknowledgement" (see page 88).
- If the direction of rotation changes without interruption during an operation, the rotary knob does not transmit any further telegram. The device evaluates this operation as a wrong operation.
- The speed of rotation is not evaluated by the device in the function with value adjustment. During a new operation, a telegram is already transmitted to the bus after the first notch (minimum rotation angle).

In a value adjustment, the device distinguishes between the following options...

- The "Starting value in case of value adjustment" parameter defines the original starting value for the adjustment. Adjustment can begin from the value configured in the ETS, from the final value of the last adjustment cycle or from the current value of the communication object.
- The parameter "Direction of value adjustment" defines whether the values, should be increased ("upwards") or reduced ("downwards") depending on the direction of rotation.
- The parameter "step width" defines the change of the value during adjustment in a positive or negative direction.
- If, during the value adjustment, the device detects that the preset step width will exceed the limits with the next telegram, the device adapts the step width once in such a way that the corresponding limit value is transmitted together with the last telegram. Depending on the setting of the parameter "Value adjustment with overflow ?" the device stops the adjustment at this point or inserts a pause consisting of two levels and then continues the adjustment beginning with the other limit value.

Function	Limit value lower	Limit value upper
0...255	0	255
0...100 %	0 % (value = 0)	100 % (value = 255)

Value range limits for the different value transmitter functions

- During a value adjustment, the newly adjusted values are only in the volatile RAM memory of the extension module. Therefore, the stored values are replaced by the preset values programmed in the ETS when a reset occurs (bus voltage failure or ETS programming).
- With the 1-byte value transmitter in the "Value transmitter 0…100 %" function, the step width of the adjustment will also be indicated in "%". If the starting value of the communication object is used, it may happen in this case during value adjustment that the value last received via the object must be rounded and adapted before a new value can be calculated on the basis of the step width and transmitted. Due to the computation procedure used, the new calculation of the value may be slightly inaccurate.

Value adjustment examples...

- Function = Value transmitter 0…255 ("Value transmitter 0…100 %" is basically the same)
- Value configured in the ETS (0...255) = 247
- The rotation angle for value adjustment = approx. 36° (3 notches)
- Step width (1...10) = 5
- Start on value adjustment = same as value after last adjustment
- Direction of value adjustment = clockwise: upwards / anticlockwise: downwards

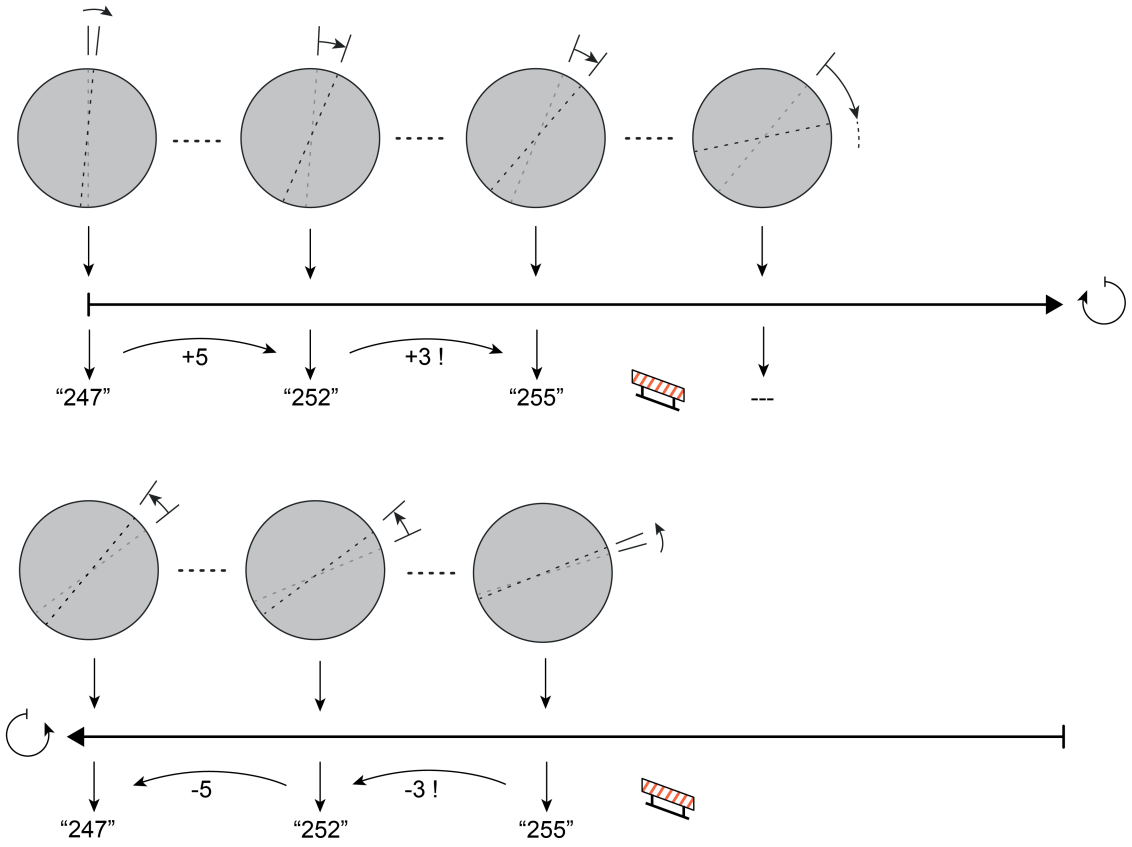

Figure 24: Example of the function "Value transmitter 0…255" with value adjustment without overflow
("Value transmitter 0…100 %" is basically the same)

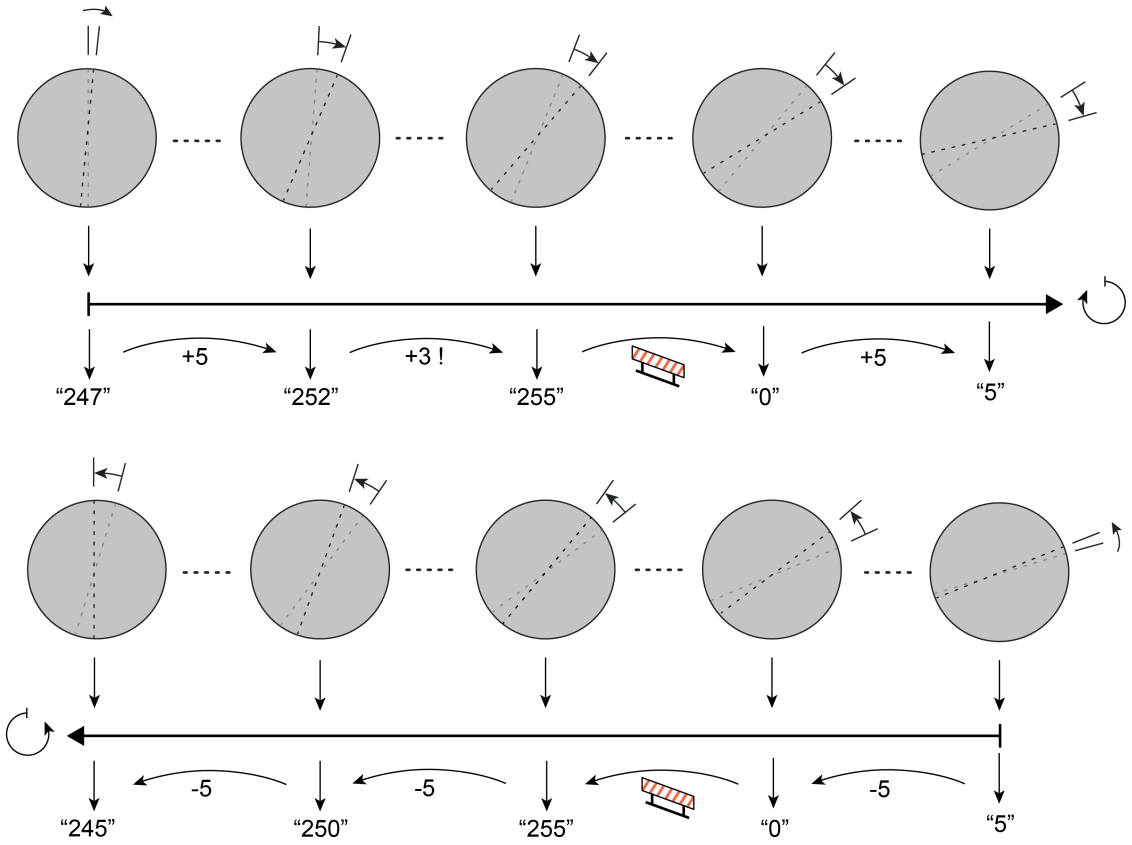

Figure 25: Example of the function "Value transmitter 0…255" with value adjustment with overflow
("Value transmitter 0…100 %" is basically the same)

i During a value adjustment up to the limits of the adjustable range, the limiting values ("0" or "255" / 100%") are always transmitted. To ensure that the original starting value (here "247") can be reset to the adjustment direction on resetting with a change, the first value jump is not equal to the preset step width (here "255" -> "252") in the case of a value adjustment without overflow. In the case of a value adjustment with overflow, an adjustment is always made based on the step width (here "255" -> "250" -> "245") after reaching the limiting values during a new adjustment in both adjustment directions. An adjustment to the original value does not take place automatically here.

Value transmitter comfort 0...255

This function allows the operation of the rotary knob for transmitting values dependent on speed and rotation angle. Here, depending on the speed of rotation, a value adjustment is possible by small and large step widths, thereby allowing the brightness of a lighting system to be set finely and gradually. During a fast rotary movement, the size of the step width is also specified by the rotation angle. The direction of rotation specifies the direction of value adjustment.

In the function "Value transmitter comfort 0…255", a value adjustment is normally executed. During an operation - depending on the direction of rotation - the value in the communication object "Feedback value" is increased or decreased by the effective step width and transmitted again to the bus via the object "value". In this way, for instance, it is easily possible to control a lighting system via a dimmer actuator. The object "value" of the rotary knob is connected to the brightness value object of the dimmer actuator via a group address. The object "Feedback value" of the rotary knob is - if the actuator has a separate 1-byte feedback object" - linked to the actuator communication object "Feedback brightness value" via a second group address. The activation of a blind or shutter actuator with communication objects for position values is

basically the same.
If the actuator does not have a separate feedback function, the object "Value" and "Feedback value" must be linked on the rotary knob to the objects via an identical group address. Otherwise, no value adjustment is possible.

- The actuator must actively transmit the feedback value on change.
- After a device reset (bus voltage return or ETS programming operation), the value of the communication object "Feedback value" is set to "0". A value adjustment then begins with this value if the activated actuator has still not transmitted any feedback to the device with an initialisation value that varies from this.

The effective step width for the value adjustment is obtained from the speed of a rotary knob operation. During a slow operation (notch by notch), the rotary knob constantly transmits values in small step width to the actuator. The value adjustment always begins with the value stored in the communication object "Feedback value". During a slow, continuous operation, the value is adjusted with each notch by the step width (1...31) configured in the ETS and transmitted via the object "value". An activated dimmer actuator e.g. receives the value sequence dimming and controls the brightness of the connected lighting system each time a new telegram is transmitted, i.e. by one notch slightly brighter or slightly darker during each adjustment of the rotary knob.
In contrast to this, a fast operation causes a significant change in brightness in this example by the rotary knob transmitting a value with a greater step width to the actuator. The size of the step width is determined by the rotation angle by which the rotary knob is turned within the operation time. The table below shows the adjustment step widths depending on the rotation angle during a fast rotary knob operation...

Rotation angle (rotation in segment)	Step width
45° (1/8 rotation)	31
90° (1/4 rotation)	63
180° (1/2 rotation)	127
360° (1/1 rotation)	255

Step widths depending on the rotation angle during a fast rotary knob operation

The rotation angle is interpreted by segments. Regardless of where the rotary knob operation starts, a value corresponding to the step width is transmitted to the bus depending on the segments during an operation (Figure 26). At the end of the control operation, only one value is ever transmitted if a corresponding segment was set. The device transmits no continuous value sequence to the bus during a fast operation.

- If the direction of rotation changes without interruption during an operation, the device transmits a value corresponding to the adjusted rotation angle until the direction is changed. Afterwards, no more telegrams are transmitted continuously until the rotary knob stops. The device then evaluates this operation as a wrong operation.

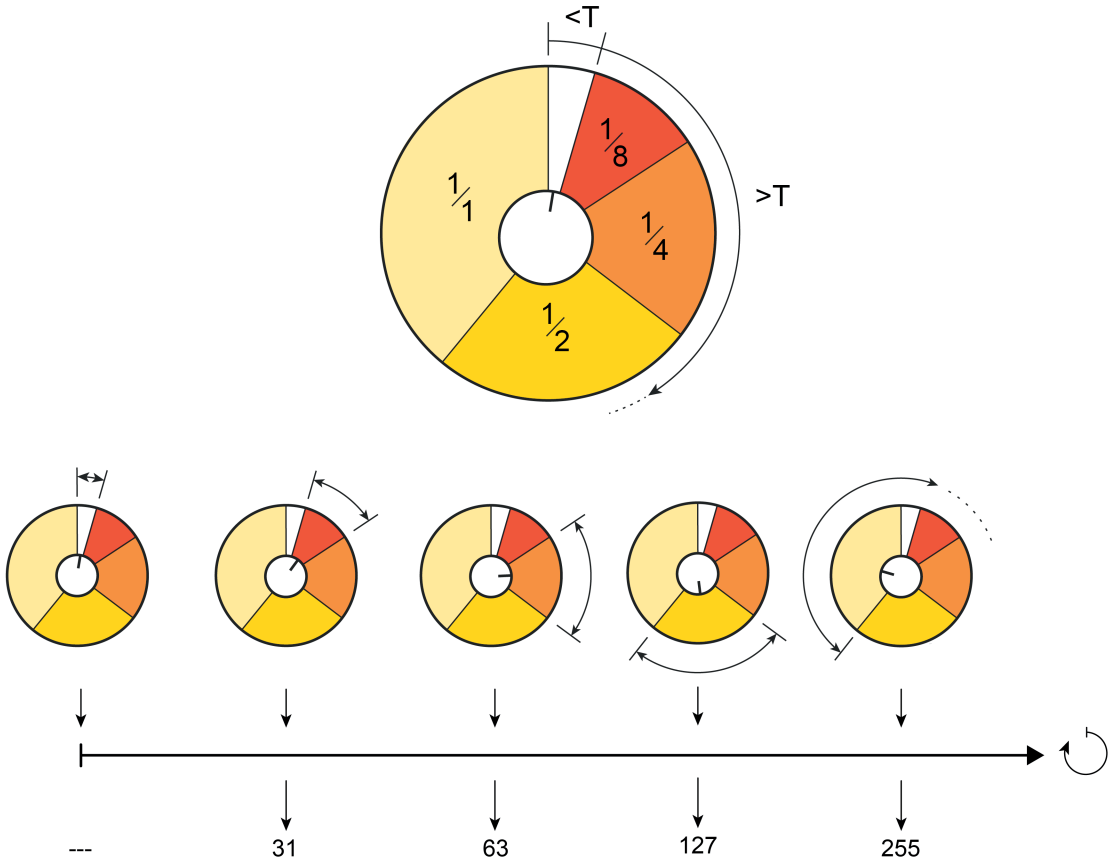

Figure 26: Rotation angle and step widths in segments during a fast rotary knob operation

T Parameter "Time for standstill after each movement"
<T slow operation: Step width according to ETS parameter
>T fast operation: Step width dependent on rotation angle

The rotary knob distinguishes between slow and fast control operations by counting the number of notches within a time period (T). The time period is defined directly by the parameter "Time for standstill after each movement" and retriggered for each new movement. If the device counts three notches within the time period, it evaluates the control operation as fast and switches over from the fixed step width according to ETS parameter to the step width dependent on rotation angle. Otherwise, it is a long control operation that is retriggered and executed with each new notch.

During a value adjustment up to the limits of the adjustable range, the limiting values ("0" or "255") are always transmitted (Figure 27). If, during the value adjustment, the device detects that the effective step width will exceed the limits with the next telegram, the device adapts the step width once in such a way that the corresponding limit value is transmitted together with the last telegram (here "247" -> "252" -> "255"). After reaching the limiting values, the value in the communication object of the feedback is always adjusted based on the effective step width (here "255" -> "250" -> "245") during a new adjustment in the other adjustment direction. An adjustment to the original starting does of a previous operation (here "247") not take place automatically here.

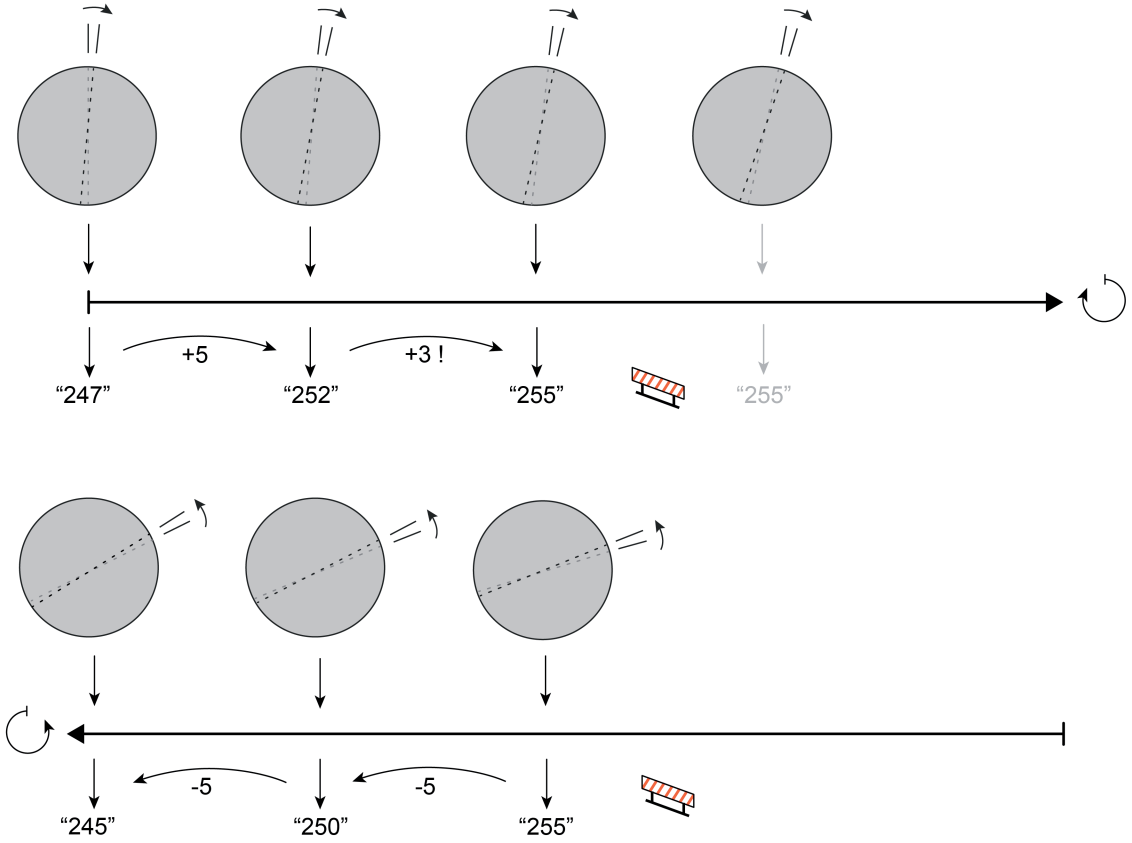

Figure 27: Example of the function "Value transmitter comfort 0…255" with value adjustment without overflow
(here: slow rotary knob operation / step width = "5")

i The transmission of a telegram during a value adjustment is not acknowledged by the internal buzzer of the device with the "Value transmitter comfort 0…255" if this is configured to the signalling function "Telegram acknowledgement". The buzzer can signal an acknowledgement of the rotary knob for this value transmitter function if required (see page 88).

4.2.4.2.5 Rotary knob function 2-byte value transmitter

With the rotary knob function "2-byte value transmitter" telegrams in compliance with the KNX data types 7.001 (unformatted) 9.001 temperature and 9.004 (brightness value) can be transmitted to the bus. The user is therefore able, for example, to specify temperature or brightness values or to generate unformatted values within a range from 0...65535. Depending on the direction of the rotary knob (clockwise or anticlockwise), different values can be transmitted to the bus via a shared communication object (Figure 28). The values can be parameterised in the ETS. It is possible optionally to make a value adjustment. In this case, only one value can be configured in the ETS for both directions of rotation, which can then be adjusted during regular operation of the device by a clockwise or anticlockwise movement (Figure 29).

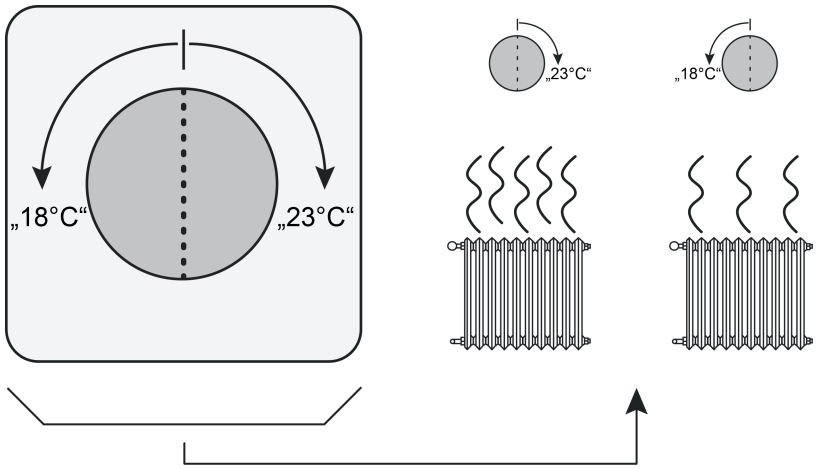

Figure 28: Example of the rotary knob function "2-byte value transmitter"
(here: temperature control / 2 discrete values without value adjustment)

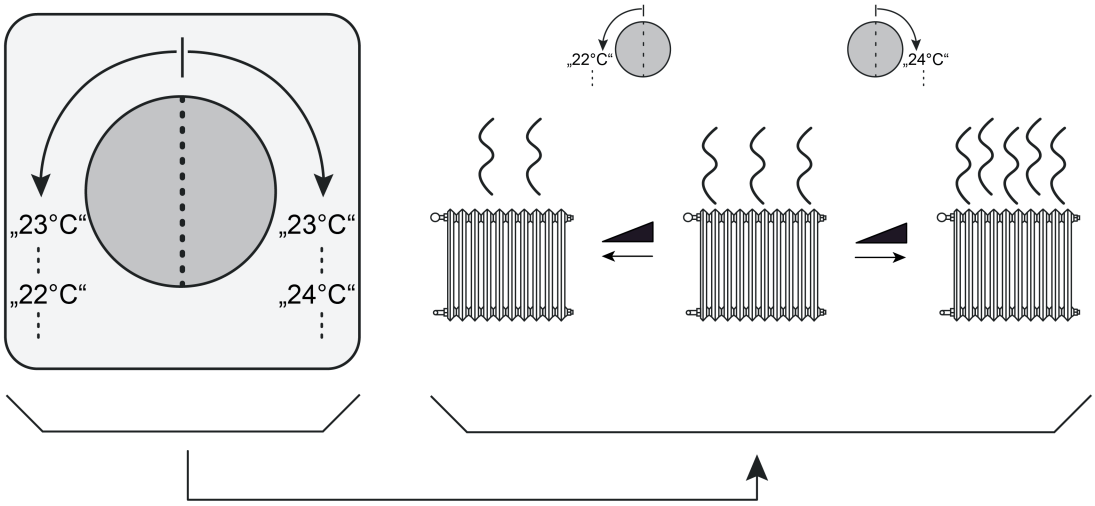

Figure 29: Example of the rotary knob function "2-byte value transmitter"
(here: temperature control / 1 values with value adjustment)

The rotary knob function "2-byte value transmitter" distinguishes three different functions...

- Temperature value transmitter
  In this function, the rotary knob transmits formatted 2-byte temperature values within a range of "0...+40°C" according to the KNX data type 9.001. Such values are normally used for basic setpoint temperatures for room temperature controllers.
  Optionally, a value adjustment can be carried out by adjusting the rotary knob by a defined rotation angle.
- Brightness value transmitter
  In this function, the rotary knob transmits formatted 2-byte temperature values within a range of "0...1500 lux" according to the KNX data type 9.004. Such values are normally used for brightness setpoint presettings for constant light regulation.
  Optionally, a value adjustment can be carried out by adjusting the rotary knob by a defined rotation angle.
- Value transmitter (0...65535)
  In this function, the device is able to transmit unformatted 2-byte values within a range "0...65535" to the bus according to the KNX data type 7.001. Such values are normally used for the presetting for counter limiting values.
  Optionally, a value adjustment can be carried out by adjusting the rotary knob by a defined rotation angle.

The rotary sensor differentiates between different operations (e.g. transmit value 1, afterwards value 2) based upon the time that the rotary knob stands still after a completed operation. The "Time for standstill after each movement" is configured in the ETS and should not be selected too short in order to avoid unintended control operations - particularly during fast operations. If the device detects additional operations immediately after a rotary movement (time not yet elapsed), it evaluates the continuing movement of the rotary knob and executes further reactions as described if necessary. The time for standstill detection is retriggered for each rotary knob movement.

With the 2-byte value transmitter a distinction is made as to whether just a value recall takes place and whether a value adjustment is also possible...

Function value adjustment disabled:
When operating the rotary knob, a 2-byte value telegram according to the ETS configuration is already transmitted in this case after the first notch (minimum rotation angle) depending on the direction of rotation. Different values can be preset for the clockwise or anticlockwise movements of the rotary knob (Figure 30). The values are always transmitted to the bus via the same communication object.

- If the direction of rotation changes without interruption during an operation, the rotary knob does not transmit any further telegram. The device evaluates this operation as a wrong operation.
- The rotation angle (number of notches during a rotary movement) and the speed of rotation have no significance for this function. During a new operation, a telegram is already transmitted to the bus after the first notch (minimum rotation angle).

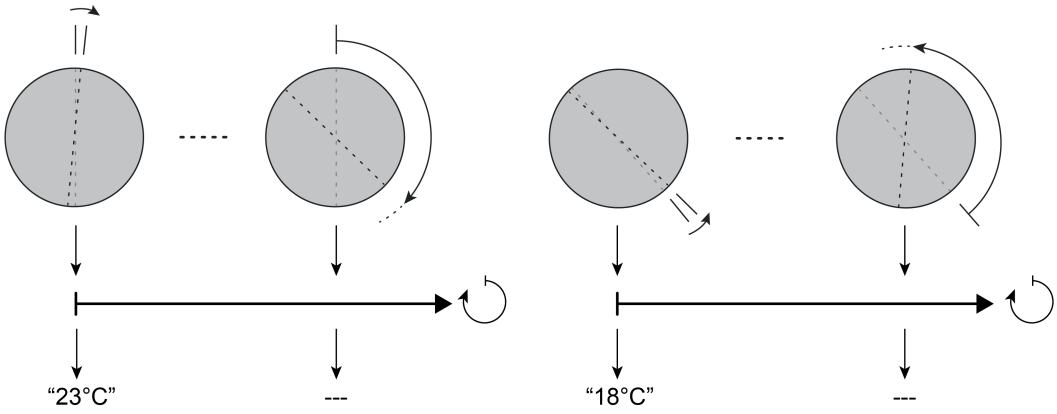

Figure 30: Example of the function "Temperature value transmitter" without value adjustment ("Brightness value transmitter" and "Value transmitter 0...65535" are basically the same)

Function value adjustment enabled:
If the value adjustment was enabled in the ETS, the rotary knob must be turned by a defined number of notches during an operation so that a value adjustment is executed. The parameter "rotation angle for value adjustment" defines the number of notches required for the value adjustment.
During an operation of the rotary knob - as with the value transmitter without value adjustment - a 2-byte value telegram is first transmitted after the first notch (minimum rotation angle) regardless of the direction it is turned. The parameter "Starting value in case of value adjustment" defines what value this is (see below). If the number of notches necessary for the value adjustment is exceeded during continuous operation, the device adjusts the value by the preset step width depending on the rotation direction and transmits this to the bus. If the operation still continues, the value is adjusted continuously.

- The transmission of a telegram can be acknowledged during a value adjustment the internal buzzer of the device. For this purpose, the buzzer must be configured to the signalling function "Telegram acknowledgement" (see page 88).
- If the direction of rotation changes without interruption during an operation, the rotary knob does not transmit any further telegram. The device evaluates this operation as a wrong operation.
- The speed of rotation is not evaluated by the device in the function with value adjustment. During a new operation, a telegram is already transmitted to the bus after the first notch (minimum rotation angle).

In a value adjustment, the device distinguishes between the following options...

- The "Starting value in case of value adjustment" parameter defines the original starting value for the adjustment. Adjustment can begin from the value configured in the ETS, from the final value of the last adjustment cycle or from the current value of the communication object (not for temperature and brightness value transmitter).
- The parameter "Direction of value adjustment" defines whether the values, should be increased ("upwards") or reduced ("downwards") depending on the direction of rotation.

- The parameter "step width" defines the change of the value during adjustment in a positive or negative direction. The step width of the temperature value transmitter is permanently defined at "1 °C". The step width size of the brightness value transmitter is permanently "50 lux".
- If, during the value adjustment, the device with the function "value transmitter 0...65535" detects that the preset step width will exceed the limits with the next telegram, the device adapts the step width once in such a way that the corresponding limit value is transmitted together with the last telegram. With the temperature or brightness value transmitter it is not necessary to adapt the step width to the range limits based on the permanent step widths. Depending on the setting of the parameter "Value adjustment with overflow ?" the device stops the adjustment at the range limits or inserts a pause consisting of two levels and then continues the adjustment beginning with the other limit value.

Function	Limit value lower	Limit value upper
Temperature value	0 °C	40 °C
Brightness value	0 lux	1,500 lux
0...65535	0	65535

Value range limits for the different value transmitter functions

i During a value adjustment, the newly adjusted values are only in the volatile RAM memory of the extension module. Therefore, the stored values are replaced by the preset values programmed in the ETS when a reset occurs (bus voltage failure or ETS programming).

Value adjustment examples...

- Function = Value transmitter 0...65535 ("Temperature value transmitter" and "Brightness value transmitter" are basically the same)
- Value configured in the ETS (0...65535) = 65517
- The rotation angle for value adjustment = approx. 36° (3 notches)
- Step width = 10
- Start on value adjustment = same as value after last adjustment
- Direction of value adjustment = clockwise: upwards / anticlockwise: downwards

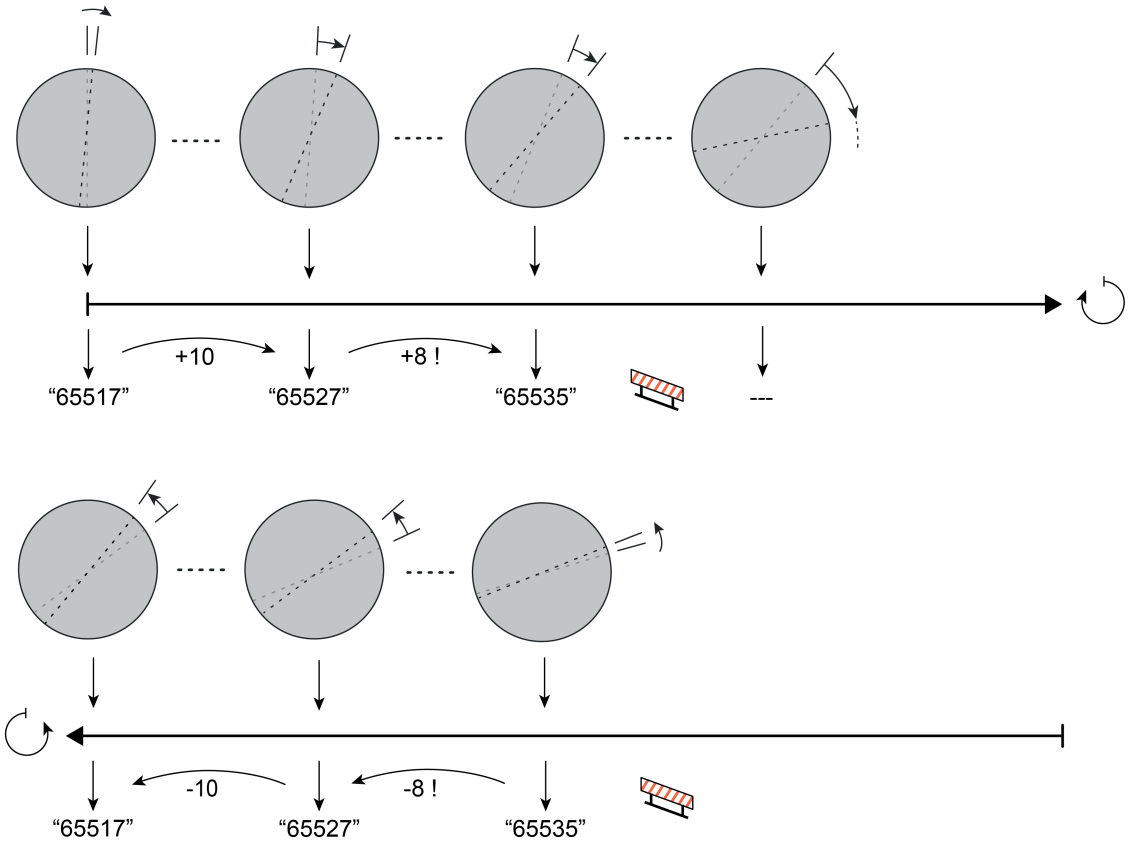

Figure 31: Example of the function "Value transmitter 0…65535" with value adjustment without overflow
("Temperature value transmitter" and "Brightness value transmitter" are basically the same)

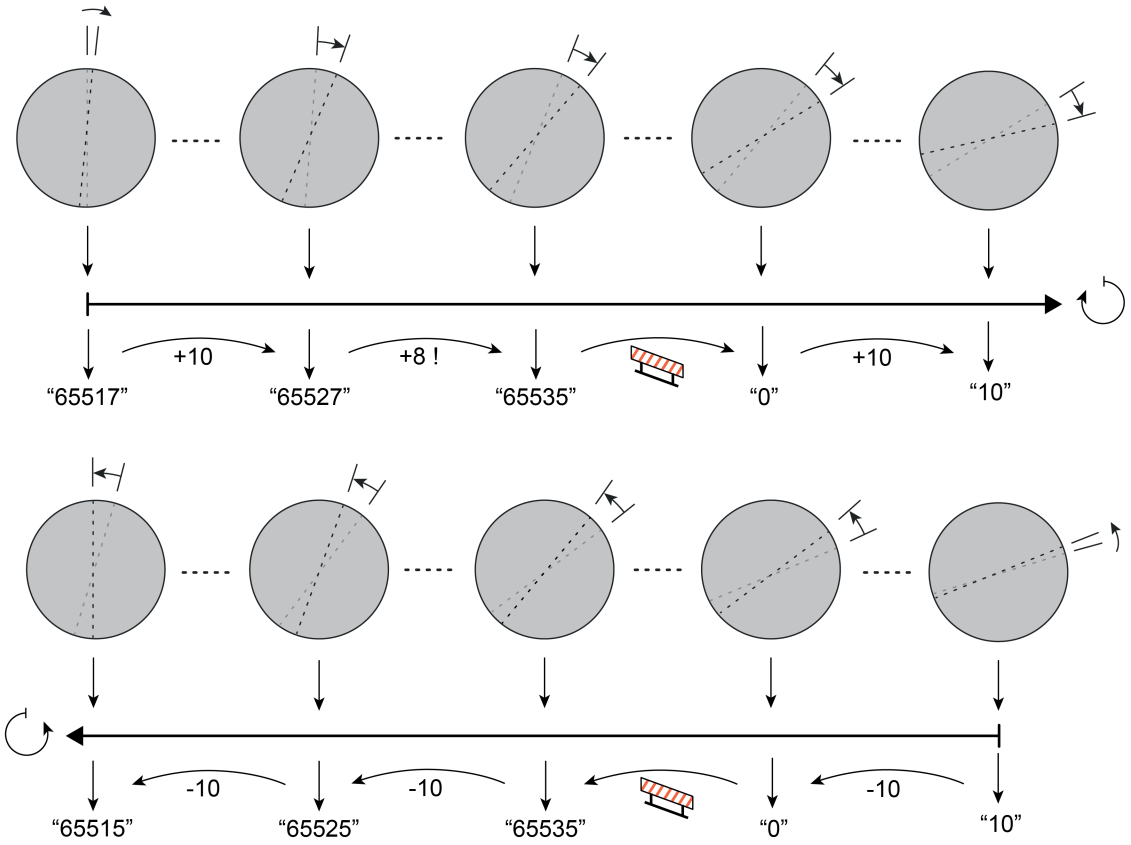

Figure 32: Example of the function "Value transmitter 0…65535" with value adjustment with overflow
("Temperature value transmitter" and "Brightness value transmitter" are basically the same)

i During a value adjustment up to the limits of the adjustable range, the limiting values ("0" or "65535" / "40°C" / "1,500 lux") are always transmitted. To ensure that the original starting value (here "65517") can be reset to the adjustment direction on resetting with a change, the first value jump is not equal to the preset step width (here "65535" -> "65527") in the case of a value adjustment without overflow. In the case of a value adjustment with overflow, an adjustment is always made based on the step width (here "65535" -> "65525" -> "65515") after reaching the limiting values during a new adjustment in both adjustment directions. An adjustment to the original value does not take place automatically here.

4.2.4.2.6 Rotary knob function scene extension

With the rotary knob function "Scene extension" an external scene stored in a KNX device (e.g. scene push button sensor, actuator) can be recalled. Depending on the movement of the rotary knob (clockwise or anticlockwise), it is possible to recall different scenes (1...64) (Figure 33). The scene numbers configured in the ETS for both directions of rotation are transmitted to the bus via a shared 1-byte communication object according to DPT 18.001.

An identical scene number can also be configured for both directions of rotation. In this case, only one scene is recalled during an operation of the rotary knob regardless of the direction.

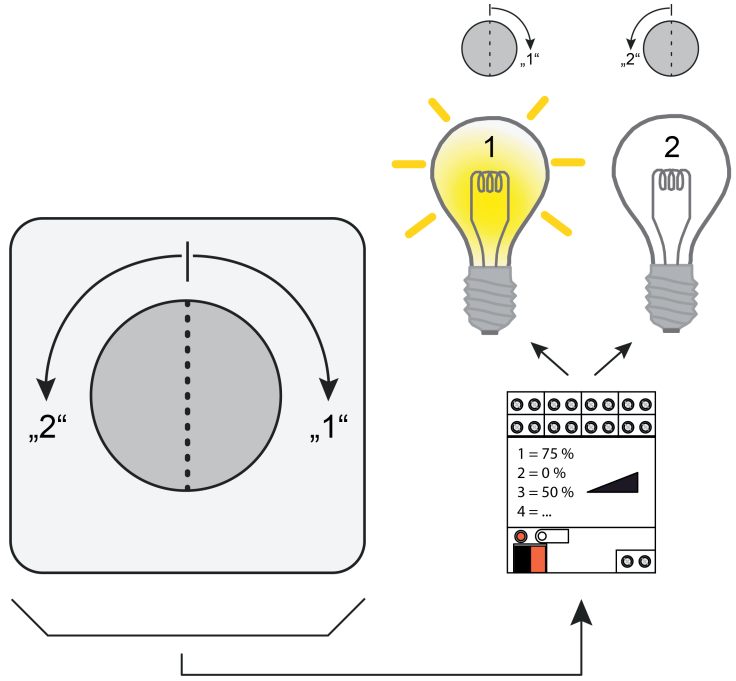

Figure 33: Example of rotary knob function "scene extension" (here: two actuator scenes are recalled)

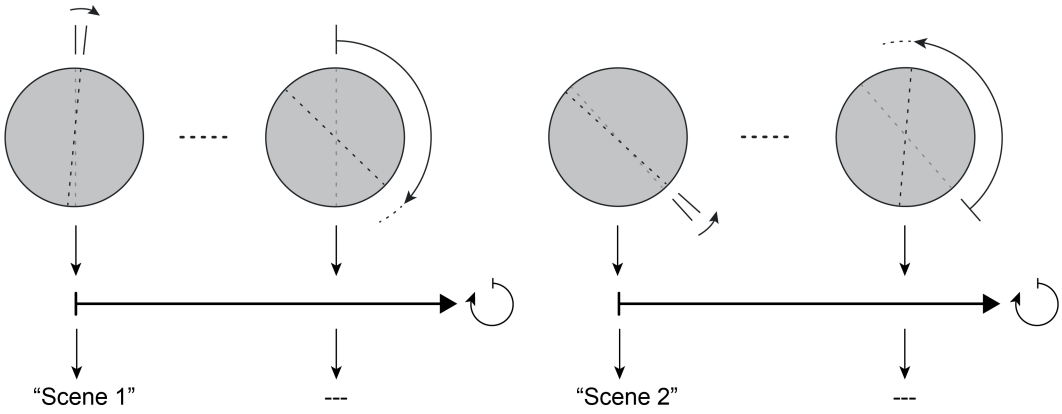

Figure 34: Example of the operation concept of the rotary knob function "scene extension"

The rotary sensor differentiates between different operations (e.g. recall scene 1, afterwards recall scene 2) based upon the time that the rotary knob stands still after a completed operation.

The "Time for standstill after each movement" is configured in the ETS and should not be selected too short in order to avoid unintended scene recall operations - particularly during fast operations. If the device detects additional operations immediately after a rotary movement (time not yet elapsed), it then ignores the continuing movement of the rotary knob. The time for standstill detection is retriggered for each rotary knob movement.

- If the direction of rotation changes without interruption during an operation, the rotary knob does not transmit any further telegram. The device evaluates this operation as a wrong operation.
- The rotation angle (number of notches during a rotary movement) and the speed of rotation have no significance for the function "Scene extension". During a new operation, a telegram is already transmitted to the bus after the first notch (minimum rotation angle).
- It is not possible to save a scene with the rotary knob function "Scene extension".

4.2.4.3 Disabling function for push-button and rotary knob

Disabling object and mode of action

Pushbuttons and rotary knobs can be disabled if required so that these operating elements either execute no functions or defined functions via separate disabling functions. The disabling function and associated parameters and communication objects are enabled if the parameter "Disabling function" is set to "enabled" on the parameter page "push-button (PB) / rotary knob (RK)".
The disabling function is then activated or deactivated via the 1-bit communication object "Disable push-button/rotary knob". You can parameterize the polarity of the disabling object. In case of polarity inversion (disabled = 0 / enabled = 1), the disabling function is not activated immediately after a bus reset or after ETS programming (object value = "0"). There must first be an object update "0" until the disabling function will be activated. Telegram updates from "0" to "0" or from "1" to "1" on the object remain without effect.

The parameter "disabling function affects" defines whether just the push-button, just the rotary knob or push-button and rotary knob are disabled similarly by a telegram to the disabling object. The parameter and object structure of the disabling function also adjusts itself according to the selection. The disabling behaviour for push-button and rotary knob can be configured independently of each other.

- An active disabling function only affects the operating functions of the push-button and/or rotary knob. The functions of the internal buzzer of the device are independent of the disabling function.
- The extension inputs of the device have their own disabling functions so that these inputs are not influenced by the disabling function of the push-button and rotary knob.
- If the energy saving mode is used, the following should be observed:
  The device will activate the energy saving mode even if the push-button and/or rotary knob are disabled. On cancelling the energy saving mode, the device reactivates the previously active disabling functions so that the push-button and/or rotary knob can still remain disabled. It is not necessary here to reactivate the disabling functions after cancelling the energy saving mode. The energy saving mode (first operation) can also be deactivated by a disabled push-button or rotary knob. The configured operating functions (switching, dimming...) will not be executed thereby, however.

Configuring the reaction for the push-button at the beginning and end of disabling

If the disabling function is used, the reaction of the push-button on activation and deactivation of the disabling function can be preset separately in the parameters.

The disabling function must have been enabled in advance.

- Set the parameter "Reaction of push-button at the beginning / end of disabling" to "No reaction".

  The push-button shows no reaction at the beginning and at the end of disabling. The sensor only adopts the state as provided for by the "Behaviour during disabling".
- Set the parameter "Reaction of push-button at the beginning / end of disabling" to "Reaction as push-button on pressing" or "Reaction as push-button on releasing".

  At the beginning or end of disabling, the push-button executes the function it has in the non-disabled state. The configuration of the push-button is then executed as intended for normal operation. The telegrams are transmitted to the bus via the communication object of the push-button.
  The following table shows all possible telegram reactions of the device depending on the push-button functions...

Function of the push-button	Reaction "as push-button on pressing"	Reaction "as push-button on releasing"
Switching / toggling	Switching telegram	Switching telegram
Dimming	Switching telegram	No telegram
Venetian blind	Move telegram	No telegram
Scene extension	Scene recall telegram	No telegram
1-byte value transmitter	Value telegram	No telegram
2-byte value transmitter	Value telegram	No telegram
2-channel operation Channel 1: 1-bit object type	Switching telegram	No telegram
2-channel operation Channel 1: 1-byte object type	Value telegram	No telegram
2-channel operation Channel 1: 2-byte object type	Temperature value telegram	No telegram
No function	No telegram	No telegram

Telegram reactions on disabling and re-enabling depending on the push-button functions

- Set the parameter "Reaction of push-button at the beginning / end of disabling" to "Reaction as disabling function push-button on pressing" or "Reaction as disabling function push-button on releasing".

  The push-button executes the function specified by the disabling function of the push-button. The disabling function is an internal button function with independent communication objects and independent parameters on the parameter page "PB - disabling function". The setting possibilities available for this disabling function are the same as for the push-button itself.
  The configuration of the disabling function is executed. If the configuration has no function or does not transmit a telegram on pressing or releasing the button, then there is no reaction to disabling or re-enabling either.
  The table above shows all possible telegram reactions of the device depending on the configuration of the disabling function for this setting, too. The telegrams are transmitted to the bus via the communication object of the disabling function.

Configuring the reaction of the push-button during a disable

Regardless of the behaviour at the beginning or end of disabling, the push-button can be influenced separately during disabling.

The disabling function must have been enabled in advance.

- Set the parameter "Behaviour of the push-button during disabling" to "no function".

  The push-button is completely disabled during disabling. Pressing a button has no effect. The buzzer then no longer signals any operations either while it is configured to "button-press display".
- Set the parameter "Behaviour of the push-button during disabling" to "as disabling function push-button".

  The push-button behaves as specified by the configuration of the disabling function. The telegrams are transmitted to the bus via the communication objects of the disabling function. The buzzer then no longer signals any operations either while it is configured to "button-press display".

If a push-button operation is taking place at the time of activation / deactivation of a disabling function, the associated operating function is aborted immediately.

Configuring the reaction for the rotary knob at the beginning and end of disabling

If the disabling function is used, the reaction of the rotary knob on activation and deactivation of the disabling function can be preset separately in the parameters.

The disabling function must have been enabled in advance.

- Set the parameter "Reaction of rotary knob at the beginning / end of disabling" to "No reaction".

  The rotary knob shows no reaction at the beginning and end of disabling. The sensor only adopts the state as provided for by the "Behaviour during disabling".

- Set the parameter "Reaction of rotary knob at the beginning / end of disabling" to "Reaction as operation in clockwise direction" or "Reaction as operation in anticlockwise direction".

  At the beginning or end of disabling, the rotary knob executes the function it has in the non-disabled state. The configuration of the rotary knob is then executed as intended for normal operation. The telegrams are transmitted to the bus via the communication object of the rotary knob.
  The following table shows all possible telegram reactions of the device depending on the rotary knob functions...

Function of the rotary knob	Reaction "as rotary knob in clockwise direction"	Reaction "as rotary knob in anticlockwise direction"
Switching / toggling	Switching telegram	Switching telegram
Dimming	Dimming telegram (step width 100% without stop)	Dimming telegram (step width 100% without stop)
Venetian blind	Move telegram	Move telegram
Scene extension	Scene recall telegram	Scene recall telegram
1-byte value transmitter	Value telegram	Value telegram
2-byte value transmitter	Value telegram	Value telegram
No function	No telegram	No telegram

Telegram reactions on disabling and re-enabling depending on the rotary knob functions

- Set the parameter "Reaction of rotary knob at the beginning / end of disabling" to "Reaction as disabling function in clockwise direction" or "Reaction as disabling function in anticlockwise direction".

  The rotary knob executes the function specified by the disabling function of the rotary knob. The disabling function is a rotary knob function with independent communication objects and independent parameters on the parameter page "RK - disabling function". The setting possibilities available for this disabling function are the same as for the rotary knob itself. The configuration of the disabling function is executed. If the configuration has no function or does not transmit a telegram on rotating clockwise or anticlockwise, then there is no reaction to disabling or re-enabling either.
  The table above shows all possible telegram reactions of the device depending on the configuration of the disabling function for this setting, too. The telegrams are transmitted to the bus via the communication object of the disabling function.

Configuring the reaction for the rotary knob during disabling

Regardless of the behaviour at the beginning or end of disabling, the rotary knob can be influenced separately during disabling.

The disabling function must have been enabled in advance.

- Set the parameter "Behaviour of the rotary knob during disabling" to "no function".

  The rotary knob is completely disabled during disabling. An operation has no effect. The buzzer then no longer signals any operations either while it is configured to "button-press display".

- Set the parameter "Behaviour of the rotary knob during disabling" to "as disabling function rotary knob".

  The rotary knob behaves as specified by the configuration of the disabling function. The telegrams are transmitted to the bus via the communication objects of the disabling function. The buzzer then no longer signals any operations either while it is configured to "button-press display".

i If a rotary knob operation is taking place at the time of activation / deactivation of a disabling function, the associated operating function is aborted immediately.

4.2.4.4 Extension inputs (E1, E2, E3)

The following section contains descriptions of the various functions that can be configured in the ETS independently for each input. The functions "Switching", "Dimming", "Venetian blind" or "Value transmitter" can be set.

4.2.4.4.1 Extension function Switching

For each input whose function is set to "Switching", the ETS displays two 1-bit communication objects (switching object X.1 and X.2). It is possible to use these two objects to transmit different switching telegrams to the bus depending on the signal edge at the input. The input parameter on the parameter page "Ix - General " (x = 1, 2, 3) can be used to define which object value is transmitted to the bus when there is a rising or falling edge at the input (no reaction, ON, OFF, TOGGLE - switchover of the object value). No distinction is made between a brief or long signal edge/actuation in the "Switching" function.

Response to bus voltage return
After a device reset (bus voltage return or ETS programming operation), the communication objects of the input can be initialised. For this, the "Behaviour on bus voltage return" parameter should be configured to the required reaction. In the settings "send ON telegram" or "send OFF telegram" telegrams are transmitted actively to the bus according to this requirement. In the "Transmit current input status" setting, the device evaluates the static signal status of the input and, according to this, transmits the appropriately configured telegram to the bus (contact closed at the input = telegram as with rising edge; contact open at input = telegram as with falling edge). If, in this case, the edge command dependent on the current status is configured to "No reaction", the device does not transmit a telegram to the bus on initialisation.
If, in the ETS, a delay is set for the extension inputs after bus voltage return, the device only transmits the telegrams when the delay has elapsed.

Cyclical transmission
Optionally, the object values can be transmitted cyclically to the bus for the "Switching" function. For this, the transmission criteria must first be defined in the ETS. The "Transmit cyclically ?" parameter on the parameter page "Ix - Transmit cyclically" (x = 1, 2, 3) specifies with which value cyclical transmission should take place. Depending on requirements, it is possible to transmit cyclically via both or just one switching object(s). In addition, it is possible to define the cycle time separately for both switching objects in the ETS.
The object value entered in the switching objects by the device on a edge change or externally by the bus is always transmitted cyclically. The object value is then also transmitted cyclically when "no reaction" is assigned to a rising or falling edge. Cyclical transmission also takes place directly after bus voltage return, if the reaction after bus voltage return corresponds to the transmission criterion for cyclical transmission. During an active disable, no cyclical transmissions take place via the disabled input.

i The energy saving mode is never activated while extension inputs are transmitting cyclically!

4.2.4.4.2 Extension function Dimming

For each input whose function is set to "Dimming", the ETS indicates a 1-bit "Switching" and a 4-bit "Dimming" object. In general, the device transmits a switching telegram on a short time input signal (triggered by the rising edge of a closed contact) and a dimming telegram on a long signal. In the standard configuration, the device transmits a telegram for stopping the dimming action after a long signal.
The length of time the input signal (closed pushbutton or switch) must last until a long actuation is detected can be set using the parameter "Time between switching and dimming" on the parameter page "Ix - General" (x = 1, 2, 3).

Operating principle
The "Operation" parameter specifies the operating principle. In the presetting of the dimming function, two-surface operation is specified here. This means that the input transmits a telegram for switching on after a short signal length and a telegram for increasing the brightness after a long signal length ("Brighter"). Alternatively, the device can transmit a telegram for switching off after a short signal length and a telegram for reducing the brightness after a long signal length ("Darker").
With a single-surface dimming function, the input transmits switch-on and switch-off telegrams ("TOGGLE") in an alternating pattern for each short signal. After long signals, the device transmits "brighter" and "darker" telegrams in an alternating pattern.

i With single-surface dimming, the following should be observed: if a dimming actuator is to be controlled from several locations, a faultless single-surface operation requires that the addressed actuator reports its switching state back to the 1-bit object of the input and that the 4-bit objects of all the sensors are interlinked. The sensor device would otherwise not be able to detect that the actuator has been addressed from another sensor, in which case it would have to be actuated twice during the next use in order to produce the desired reaction.

The additional input parameters on the parameter page "Ix - General" can be used to specify in which step width brighter or darker dimming take place, whether a stop telegram is transmitted on a falling edge or whether the dimming telegram is to be repeated cyclically.

Response to bus voltage return
After a device reset (bus voltage return or ETS programming operation), the communication object "Switching" of the input can be initialised. For this, the "Behaviour on bus voltage return" parameter should be configured to the required reaction. In the settings "send ON telegram" or "send OFF telegram" telegrams are transmitted actively to the bus.
If, in the ETS, a delay is set for the extension inputs after bus voltage return, the device only transmits the telegrams when the delay has elapsed.
After a device reset, the "Dimming" object is always initialised with "0".

4.2.4.4.3 Extension function Venetian blind

For each input, whose function is set to "Venetian blind", the ETS indicates the two 1-bit objects "Short time operation" and "Long time operation".
For the control of Venetian blind, roller shutter, awning or similar drives, the device supports two operation concepts for the Venetian blind function in which the telegrams are transmitted in different time sequences. The device can therefore be used to operate a wide variety of drive configurations. In the ETS, the operating concept of an input is defined using the parameter of the same name on the parameter page "Ix - General" (x = 1, 2, 3). The following settings are possible...

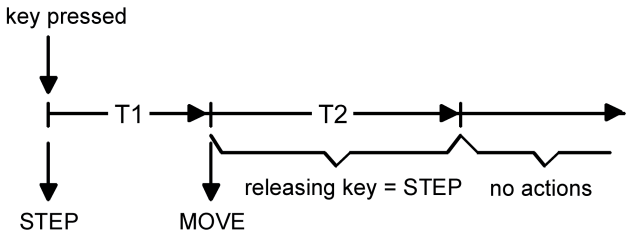

Figure 35: Operation concept "short – long – short"

Operation concept of the Venetian blind function
Operation concept "short - long – short":
In the operation concept "short – long – short", the input shows the following behaviour:

- Immediately after a rising edge (closed pushbutton or switch) the input transmits a short time telegram onto the bus. Pressing the button stops a running drive and starts time T1 ("time between short time and long time operation"). If the a falling edge is detected within T1 (closed pushbutton or switch), no further telegram will be transmitted. This short time serves the purpose of stopping a continuous movement.
  The "Time between short time and long time command" in the input parameters should be selected shorter than the short time operation of the actuator to prevent a jerky movement of the shutter.
- If the button is kept depressed longer than T1, the input transmits a long time telegram after the end of T1 for starting up the drive and time T2 ("slat adjusting time") is started.
- If a falling edge is detected within the slat adjustment time, the input transmits an additional short time telegram. This function is used for adjusting the slats of a blind. The function permits stopping the slats in any position during their rotation.
  The "slat adjusting time" should be chosen as required by the drive for a complete rotation of the slats. If the "slat adjusting time" is selected longer than the complete running time of the drive, a push button function is possible as well. This means that the drive is active only when a button connected to the input is kept depressed.
- If the button is kept depressed longer than T2, the input transmits no further telegram. The drive remains on until the end position is reached.

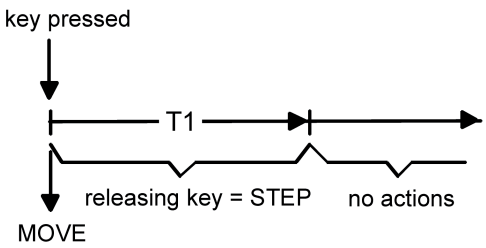

Figure 36: Operation concept "long – short"

Operation concept "long – short":
In the operation concept "long – short", the input shows the following behaviour:

- Immediately on pressing the button, the input transmits a long time telegram. The drive begins to move and time T1 ("slat adjusting time") is started.
- If a falling edge is detected within the slat adjustment time, the input transmits a short time telegram. This function is used for adjusting the slats of a blind. The function permits stopping the slats in any position during their rotation.
  The "slat adjusting time" should be chosen as required by the drive for a complete rotation of the slats. If the "slat adjusting time" is selected longer than the complete running time of the drive, a push button function is possible as well. This means that the drive is active only when a button connected to the input is kept depressed.
- If the button is kept depressed longer than T1, the input transmits no further telegram. The drive remains on until the end position is reached.

Edge evaluation
The parameter "Command on rising edge" on the parameter page "Ix - General" (x = 1, 2, 3) specifies the direction of movement of the short time or long time telegram. In the "TOGGLE" setting (single-surface operation) the input switches the direction of the short and long time telegram each time there is a new signal. Several short time telegrams in succession have the same direction.

i If the actuator is to be controlled from several locations, a faultless single-surface actuation requires that the all long time objects of the sensor devices are interlinked. A sensor device would otherwise not be able to detect that the actuator has been addressed from another sensor, in which case it would have to be actuated twice during the next use in order to produce the desired reaction.

Response to bus voltage return
After a device reset (bus voltage return or ETS programming operation), the communication object "Long time operation" of the input can be initialised. For this, the "Behaviour on bus voltage return" parameter should be configured to the required reaction. In the settings "Up" or "Down", telegrams are transmitted actively to the bus.
If, in the ETS, a delay is set for the extension inputs after bus voltage return, the device only transmits the telegrams when the delay has elapsed.
After a device reset, the "Short time operation" object is always initialised with "0".

4.2.4.4.4 Extension function Value transmitter / Scene extension

For each input whose function is set to "Value transmitter", the ETS indicates either a 1-byte or a 2-byte object. The data format of the value object is dependent on the set function of the value transmitter. The "Function as" parameter on the parameter page "Ix - General" (x = 1, 2, 3) defines the function on one of the following value transmitter applications...

- Dimming value transmitter (1-byte),
- Temperature value transmitter (2-bytes),
- Brightness value transmitter (2-bytes),
- Light scene extension without memory function (1-byte),
- Light scene extension with memory function (1-byte).

The dimming value transmitter, temperature and brightness value transmitter different in data format and in the range of values. The independent function of the light scene extension is special and is described below.

Dimming value transmitter, temperature and brightness value transmitter
In the function as a dimming value transmitter, the input can transmitted unformatted integers in the range 0 ... 255 to the bus. As a brightness value transmitter, the input transmits formatted floating point values in the range 0 … 1500 Lux and, as a temperature value transmitter, in the range 0 … 40 °C. The following table shows a summary of the value ranges of the value encoders. The values to be transmitted are configured in the ETS and can be adjusted later during device operation (see value adjustment below).
The edge evaluation of the device means that it can transmit values only on a rising edge, only on a falling edge or on a rising and falling edge. In this way, it is possible to make adjustments to the contact connected at the input (pushbutton as NC contact or NO contact and switch).

Value transmitter type	Function	Limit value lower	Limit value upper
Dimming value transmitter	0 ... 255	0	255
Temperature value transmitter	Temperature value	0 °C	40 °C
Brightness value transmitter	Brightness value	0 lux	1,500 lux

Value ranges of dimming value transmitter, temperature and brightness value transmitter

Value adjustment for dimming value transmitter, temperature and brightness value transmitter
With the dimming value transmitter and the temperature and brightness value transmitter, the value to be transmitted can be adjusted at any time during device operation. A value adjustment can only be configurable in the ETS when the value is to be transmitted only on a rising edge or only on a falling edge, i.e. a pushbutton is connected to the input.
A value adjustment is introduced by a long signal at the input (> 5 s) and continues for as long as the signal is detected as active, i.e. the pushbutton is actuated. With the first adjustment after commissioning, the value programmed by the ETS is increased cyclically by the step width configured for the dimming value transmitter and transmitted. The step width of the temperature value transmitter (1 °C) and the brightness value transmitter (50 Lux) is permanently defined. The previously transmitted value is saved after releasing the pushbutton. The next long pushbutton actuation adjusts the saved value and the direction of the value adjustment changes.
The time between two telegrams on adjusting values can be configured in the ETS.

Example of value adjustment (Figure 37):
- Function as dimming value transmitter
- Transmit value on = Rising edge
- Value configured in the ETS for rising edge = 17
- Step width = 5

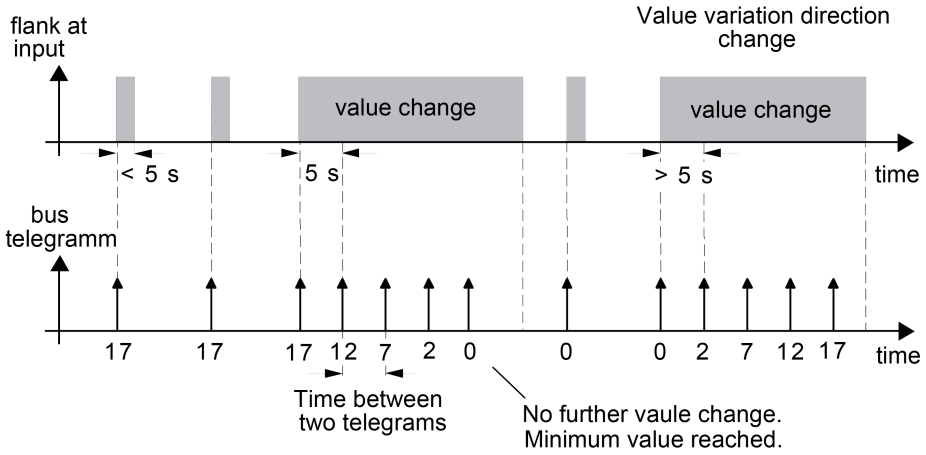

Figure 37: Example to change the value for dimming value transmitter

- There is no value over- or underrun on adjustment. If, during an adjustment, the maximum or minimum value is reached, no more telegrams are transmitted.
- To ensure that, during a value adjustment, for example the controlled lighting switches off or switches on at the maximum, the limit values (e.g. the values "0" or "255") are always transmitted when the limits of the adjustable range are reached. This also takes place when the configured step width of these values is not immediately taken into account (see example above: step width = 5; value "2" is transmitted, then value "0").
  In this case, to ensure that the original starting value can be reset on resetting with a change to the adjustment direction, the first value jump is not equal to the preset step width (see example above: step width = 5; value "0" is transmitted, then values "2"; "7" etc.).
- The newly adjusted values are stored in RAM. After a device reset (bus voltage failure or ETS programming operation), the adjusted values are replaced by the values originally configured in the ETS.

Light scene extension

With a configuration as a light scene extension without a memory function, it is possible to recall a light scene, which is stored in an external bus subscriber (e.g. light scene pushbutton sensor) With a rising, falling or rising and falling edge, the light scene number configured in the ETS is immediately transmitted to the bus.
With a configuration as a light scene extension with a memory function, it is possible to generate a memory telegram according to the light scene to be transmitted. For this, the appropriate memory telegram is transmitted for a long signal according to the configured edge evaluation (pushbutton as NC contact or NO contact - not as switch!). In this case, the time for long actuation can be configured (but not to below 5 s). With short actuation < 1 s, the configured light scene number (without memory telegram) is transmitted. If the actuation last longer than 1 s but less than 5 s, no telegram is triggered.
In addition, there is the option of only transmitting a memory telegram without prior light scene recall. In this case, the parameter "Only memory function ?" must be set to "Yes".

Examples for a light scene extension with memory function (Figure 38):
1.) Only memory function = No
2.) Only memory function = Yes

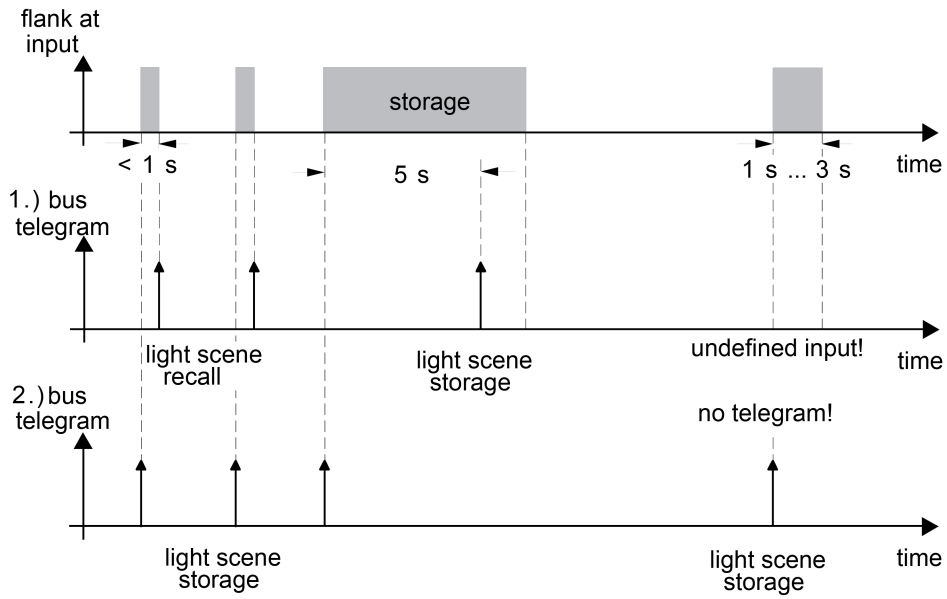

Figure 38: Example of scene storage

"Only memory function = No":
If a rising or falling edge is detected at the input (according to the configuration), the time recording operation begins. If actuation ceases during the first second, the appropriate light scene recall takes place immediately. If the signal length is longer, then the memory telegram is transmitted after 5 s.

"Only memory function = Yes":
The memory telegram is transmitted immediately after detection of the appropriate signal edge.

Behaviour on bus voltage return for value transmitter and light scene extension
After a device reset (bus voltage return or ETS programming operation), the communication object of the value transmitter or light scene extension can be initialised. For this, the "Behaviour on bus voltage return" parameter should be configured to the required reaction. The setting is dependent on the value transmitter function and edge evaluation selected in the ETS. In the settings "Reaction as rising edge" or "Reaction as falling edge", telegrams are transmitted actively to the bus according to the configuration in the ETS. In the "Transmit current input status" setting, the device evaluates the static signal status of the input and, according to this, transmits the appropriately configured telegram to the bus (contact closed at the input = telegram as with rising edge; contact open at input = telegram as with falling edge). This setting can only be configured with "Transmit value on = rising and falling edge (switch)".
If, in the ETS, a delay is set for the extension inputs after bus voltage return, the device only transmits the telegrams when the delay has elapsed.

4.2.4.4.5 Disabling function for extension inputs

The extension inputs can be separately disabled via the bus using 1-bit objects. With the "Switching" function, it is possible to disable the two switching objects of an input independently of each other.
With an active disabling function, signal edges at the input are ignored by the device related to the affected objects.

Each input or each switching object can execute a specific independent reaction at the beginning or end of a disable. This reaction is specified on the parameter page "Ix - disable" (x = 1, 2, 3) in the ETS and is dependent on the edge evaluation defined for the affected input. In so doing, it is possible to configure to "No reaction". Only in this case are dimming or Venetian blind control operations or value adjustments completed during an active disable and only then the input locked. In all other cases, the configured disabling command is executed immediately at the beginning of disabling.
In the "Transmit current input status" setting, the device evaluates the current static signal status of the input and, according to this, transmits the appropriately configured telegram to the bus (contact closed at the input = telegram as with rising edge; contact open at input = telegram as with falling edge).

A disabling function is activated or deactivated by the corresponding 1-bit object. The telegram polarity can be set in the ETS for each disabling object. The disabling object is always inactive after a device reset. Even with an inverted polarity "Disabling = 0 (Enabling = 1)", a "0" telegram must first be received after a reset until the appropriate disabling function is activated.

- Updates to disabling objects with the same telegram polarity (disabling -> disabling or enabling -> enabling) do not show a reaction.
- With cyclical transmission in the "Switching" function: during an active disable, cyclical transmission does not take place via the disabled input switching object. Cyclical transmission is continued immediately at the end of the disabling with the last object value written to the object, providing that the transmit criterion for cyclical transmission is fulfilled (transmit on ON, on OFF or on ON and OFF).

4.2.4.5 Acoustic signal encoder

The device has an acoustic buzzer (Piezo signal transmitter) that can be used for acknowledgement or status signalling. Additionally, the integrated buzzer can signal a warning or ring tone, an alarm and an active programming mode. Since the buzzer can signal different states that can also occur simultaneously, a signalling priority must be set (see table below). A signal with higher priority overrides a signal with lower priority.

Signalling state	Priority	Type of signalling
Programming mode	1 (highest)	pulsing tone (0.5 Hz)
Signalling of an alarm	2	pulsing tone (2 Hz)
Ring tone/warning tone	3	Single tone with adjustable signal duration
Signal on actuation *	4 (lowest)	Single tone with adjustable signal duration
Signal on telegram acknowledgment *	4 (lowest)	Single tone (250 ms)
Signal on saving a scene *	4 (lowest)	Single tone (2 s)
Signal on value adjustment *	4 (lowest)	Single tone (250 ms)
Signal on status signal via object *	4 (lowest)	Single tone or pulsating tone (1 Hz)

Signal priorities of the internal buzzer

The function-dependent signals (*) have the lowest priority. These signalling functions are configured in the ETS (alternatively: acknowledgement signalling, telegram acknowledgement, status signalling) and executed additionally by operating functions (signal on saving a scene, signal on value adjustment). The signals of the operating functions are only executed, however, if the signalling function of the buzzer is configured in the ETS to "acknowledgement signalling". The buzzer then reacts similarly to operations of the rotary knob or push-button.
The function-dependent signals have the same priority to one another, which means that the event that most recently occurred determines the signalling behaviour of the buzzer if no signalling with higher priority (1...3) is active.

i On activation of the energy saving mode, the acoustic signal transmitter of the device is switched off under forced control. An acoustic signal with low or medium priority, which was active before the energy saving mode and aborted or should be activated during the energy saving mode, is not executed again or recovered automatically on deactivation of the energy saving mode. The buzzer must first be reactivated before it executes an acoustic signal again.
Exception: The device will not activate the energy saving mode while an alarm function (high priority) is signalled by the buzzer! If the device should activate the energy saving mode during an active alarm message, the execution of the energy saving mode will be delayed until the end of the alarm message. The device ignores telegrams for activation of the alarm function, however, if the energy saving mode was already activated previously. Thus, an object update of the alarm function during the energy saving mode will not cause the alarm function to be executed. Just like in the case of signalling with a lower priority, an alarm function that was active before the energy saving mode and aborted or should be activated during the energy saving mode, is not executed again or recovered automatically on deactivation of the energy saving mode. Here, too, the alarm object must first be reactivated.

i The programming mode overrides the signalling of an alarm, among other things. On deactivation of the programming mode by the programming button, an alarm message that is still active will no longer be signalled. To repeat or restart the alarm, the alarm must first be switched off here and then reactivated.

Signalling the programming mode

As soon as the programming mode is activated by pressing the programming button on the device or by a corresponding object service telegram (e.g. the ETS), the buzzer outputs a pulsating tone at a frequency of approx. 0.5 Hz. The tone output continues while the programming mode is active.

i The tone output in the programming mode is always at maximum volume.

Signalling of an alarm

The device permits signalling of a alarm which might be, for instance, a burglar or a fire alarm from a KNX central alarm unit. If the alarm message has been activated, the buzzer outputs a pulsating tone at a frequency of approx. 2 Hz at a volume configurable separately for the alarm message. In addition, the red Status LEDs always flash cyclically at the same frequency.
The signalling of an alarm can be enabled separately by the parameter "Alarm function" on parameter page "PB/RK - Buzzer".

When alarm signalling is enabled, the ETS displays the communication object "Switch alarm" and further alarm function parameters. The object "Switch alarm" is used as an input for activating or deactivating the alarm message. The polarity of the object can be selected. When the object value corresponds to the "Alarm" state, the buzzer outputs the alarm tone. The alarm function then overrides acoustic signalling with lower priority (see page 86). The buzzer only executes signalling with lower priority again as intended after the alarm signalling function has been deactivated.

Apart from the possibility of deactivating an alarm message via the alarm object, it can also be deactivated locally on the device by operating the rotary knob or pressing the push-button. The parameter "Reset alarm message by operation?" defines the acknowledgement response during an alarm…

- If this parameter is set to "Yes", an active alarm message can be deactivated by operating the rotary knob or pressing the push-button. This does not cause the configured operating function to be executed. The device only executes the intended operating function after a subsequent operation (Switching, dimming...).
- If "No" has been selected, an alarm message can only be deactivated via the object "Switch alarm". An operation on the device always executes the configured button function immediately.

If an alarm message can be deactivated by an operation on the device, the parameter "Acknowledge alarm message by" defines whether an additional alarm for acknowledging the telegram should be transmitted to the bus via the separate object "Acknowledge alarm" after resetting the alarm.
Such an acknowledge telegram can be sent, for instance, via a 'listening' group address to the "Switch alarm" objects of other rotary sensors or push-button sensors with the same alarm functionality in order to reset an alarm status there as well. Attention must be paid during resetting of an alarm to the selectable polarity of the acknowledge object.

i It is possible to disable the rotary knob or push-button. It should be noted that an alarm message is not possible by a disabled rotary knob or disabled push-button!

i The extension inputs cannot acknowledge an alarm message.

i Notes on the polarity of the alarm object: If the setting is "'0' = alarm / '1' = reset alarm", the alarm object must first be actively written by the bus with "0" to activate the alarm after a reset or after programming with the ETS.

i An active alarm signal is not stored so that this is always deactivated after a device reset or after programming with the ETS.

Signalling of a warning/ring tone

The device enables the signalling of a warning/ring tone in addition to acknowledgement or status signalling. The warning/ring tone is activated by a separate 1-bit communication object. As soon as a "1"-telegram is received via the object "warning tone/ring tone", the buzzer outputs a single tone. The signal duration can be configured in the ETS. The tone can also be switched off before the signal duration has elapsed by receiving a "0" telegram via the object.
Each "1" telegram retriggers the tone output. Thus, the signal duration is retriggered as a result.

The volume of the warning/ring tone can be differentiated into two settings (volume 1, volume 2) and switched over by a 1-bit communication object during regular operation of the device (see page 88-89).

i A warning/ring tone can be combined in the ETS with an acknowledgement signal, or alternatively, with a telegram acknowledgment. In this case, the warning/ring tone has a higher priority.

Function-dependent signals

Function-dependent signals have the lowest priority. These signals are function-dependent because, firstly, they are configured alternatively in the ETS (acknowledgement signalling, telegram acknowledgement, status signalling), and secondly, are also executed automatically by operating functions (signal on saving a scene, signal on value adjustment). The signals of the operating functions are only executed, however, if the signalling function of the buzzer is configured in the ETS to "acknowledgement signalling". The buzzer then reacts similarly to operations of the rotary knob or push-button.

When the buzzer works as acknowledgement signalling, it outputs a single tone with an adjustable signal duration during an operation of the rotary knob or push-button. In addition, a signal occurs when a storage telegram is transmitted in the function "Scene extension" or when a telegram is transmitted for the value adjustment in the function "value transmitter". The signal duration of the acknowledgement signalling can be set in the ETS. In contrast to this, the signal duration of the signalling for a storage telegram (2 seconds) and the value adjustment (250 milliseconds) is permanently defined.

Alternatively, the telegram acknowledgment can be configured for acknowledgement signalling. The telegram acknowledgment only signals the transmission of telegrams in the function "2-channel operation" (signal duration 250 milliseconds), the transmission of a scene storage telegram or the transmission of telegrams for value adjustment (not with "Value transmitter comfort 0…255") in the described signal lengths. Other operations of the rotary knob or push-button are not signalled after the telegram acknowledgement.

As a further alternative to acknowledgement signalling or telegram acknowledgment, it is possible to activate the buzzer as status signalling via a communication object of its own. During the status signalling, it is possible to distinguish whether the buzzer outputs a single tone or pulsating tone at a frequency of approx. 1 Hz by means of a parameter setting in the ETS. In both cases, the signal duration can be set in the ETS.
As soon as the device receives a "1"-telegram via the status object of the buzzer, the buzzer outputs the configured tone for the preset signal duration. The tone can also be switched off before the signal duration has elapsed by receiving a "0" telegram via the status object.
Each "1" telegram retriggers the tone output. Thus, the signal duration is retriggered as a result.

i An acknowledgement signal, or alternatively, a telegram acknowledgment, can be combined optionally in the ETS with the signalling of a warning/ring tone. In this case, the warning/ring tone has a higher priority.

Buzzer volume

The buzzer can output signal tones at different volumes. Depending on the signalling function, the volume is either preset or is configurable at up to three different volume levels in the ETS (see table below).

Signalling state	Volume
Programming mode	maximum volume (Level 4)
Signalling of an alarm	ETS: Volume for alarm (configurable)
Ring tone/warning tone	ETS: volume 1 or 2 (switchable)
Signal on actuation *	ETS: volume 1 or 2 (switchable)
Signal on telegram acknowledgment *	ETS: volume 1 or 2 (switchable)
Signal on saving a scene *	ETS: volume 1 or 2 (switchable)
Signal on value adjustment *	ETS: volume 1 or 2 (switchable)
Signal on status signal via object *	ETS: volume 1 or 2 (switchable)

Volume levels of the different signalling functions

The volume for the function-dependent signals (*) and warning/ring tone can be differentiated into two settings (volume 1, volume 2) and switched over by a 1-bit communication object during regular operation of the device. In this way, for instance, adaptation to local conditions or a change-over from day to night (loud <-> quiet) is possible. The telegram polarity of the object for changing volume can be configured in the ETS.
The volume can be set at up 5 different levels. A setting between "level 1 (quiet)" and "level 4 (loud)". The level "mute (OFF)" deactivates the buzzer at the selected volume.

i After a device reset (bus voltage return or ETS programming operation), the value of the communication object for changing volume is always set to "0", whereby the volume assigned to this telegram polarity is active immediately. In the setting "'0' = volume 2 / '1' = volume 1" for the parameter "Polarity object for changing volume", the volume 2 is then active immediately after the reset.

The volume of the alarm message can be adjusted in the ETS if the alarm function is enabled. The programming mode is always signalled at maximum volume.

4.2.4.6 Status-LED (only with application program of version 1.2)

The rotary sensor has two red Status LEDs, which can be configured independently of one another. The Status LEDs can execute various display functions, provided that their use is generally enabled on the parameter page "Push-button (PB) / Rotary knob (RK)". The left Status LED is assigned to the push-button and the right LED to the rotary knob. Consequently, the LEDs display operations of a button-press display or telegram acknowledgment according to this assignment.

.

i The LED display functions can only be configured and used with Version 1.2 of the application program! If Version 1.1 of the application program is used, the Status LEDs are only activated when alarm signalling is active.

i The Status LEDs always indicate that an application program has been unloaded by flashing slowly.

The following functions can be configured separately for each Status LED...

- always OFF,
- always ON (orientation light),
- Status indicator (via LED object),
- Inverted status indicator (via LED object),
- Button-press display.

The following function can additionally be configured specially for the left Status LED (push-button)...

- Telegram acknowledgment.

Function "Always OFF" or "Always ON"
With this parameterisation, a status LED remains permanently switched on or off. Permanently switched-on Status LEDs can be used, for example, for orientation lighting.
Special case: In the "Always OFF" setting, the Status LEDs display adjustments of the transmission values in the "Value transmitter" button or rotary knob function, provided that this function has been enabled in the ETS and is executed by the operator. The LEDs then light up briefly when a new value adjustment telegram is transmitted. In the case of the left Status LED for the push-button, in the "Always ON" setting, the continuous light is interrupted for the length of the value adjustment. The LED lights up briefly for each adjustment value transmitted to the bus. By contrast, when in "Always ON", the right Status LED of the rotary knob remains switched-on without interruption, even if a value is adjusted.

Function "Button-press display"
If a Status LED is working as a button-press display, it lights up when the rotary knob or the push-button is actuated. In the case of the rotary knob, the right-hand LED always then lights up at the start of an operation. In the case of the push-button, the Status LED lights up on pressing and releasing (exception: Scene extension with memory function: Here, after short operations, the LED only lights up on release).
In addition, the LED signals to the push-button when a storage telegram is being transmitted in the function "Scene extension". In addition, in the "Value transmitter" function, the LEDs for the push-button and rotary knob display the transmission of a value adjustment telegram.
The light period of the button-press display can generally be set in the ETS using the "Light period of the Status LED for button-press display" parameter. In contrast to this, the signal duration of the display for a scene storage telegram (approx. 3 seconds) and the value adjustment (250 milliseconds) is permanently defined.

Function "Telegram acknowledgment"
This setting is only available for the Status LED of the push-button. As an alternative to the

button-press display, the telegram acknowledgment can then be configured. The telegram acknowledgment only signals the transmission of telegrams in the function "2-channel operation" (fixed display period 250 milliseconds). Other operations of the rotary knob or push-button are not displayed after the telegram acknowledgement.

Function "Status display" and "Inverted status display"
Irrespective of the configurations of the push-button or rotary knob, each status LED can indicate the state of a separate LED communication object. Here, the LED can be switched on or off statically via the 1-bit object value received. It is possible to display the inverted object value.
After a reset or after ETS programming, the value of the LED objects is always "0".

- Besides the functions that can be set separately for each status LED, all the status LEDs are always used for alarm signalling. If the alarm function is active, both Status LEDs flash simultaneously. After deactivation of the alarm signalling, all LEDs will immediately return to the state corresponding to their configuration or communication objects.
- Status displays, which were active before energy-saving mode, are first executed unchanged when energy-saving operation is deactivated. New control of the objects of the display functions must then take place for the Status LEDs to signal a current status, or possibly a different one.
  Exception: The device will not activate the energy saving mode while an alarm function is signalled by the LED! If the device should activate the energy saving mode during an active alarm message, the execution of the energy saving mode will be delayed until the end of the alarm message. The device ignores telegrams for activation of the alarm function, however, if the energy saving mode was already activated previously. Thus, an object update of the alarm function during the energy saving mode will not cause the alarm function to be executed. Just like in the case of status signalling, an alarm function that should be activated during the energy saving mode is not recovered automatically on deactivation of the energy saving mode. Here, too, the alarm object must first be reactivated.

4.2.4.7 Energy saving mode

The device has an energy-saving mode to save electrical energy during operation. If the function is used, the device switches to the energy saving mode after a preset time without operation or switches to a separate object controlled by an external telegram (see "Activating energy saving mode"). In the energy saving mode, essential operation and signalling functions of the device are switched off. The acoustic signal transmitter, the Status LED and the extension inputs are then without any functions.
The energy saving mode can be deactivated by operating the rotary knob or push-button or by a special telegram (see "Deactivating energy saving mode"). Afterwards, the device is fully functional again.

Activating energy saving mode

The device has two different activation options for setting the rotary sensor to the energy saving mode. These can either be combined together or used separately. Firstly, the rotary sensor can be set to the energy saving mode by a group telegram using a communication object designated for this purpose. To do this, the telegram polarity that triggers the activation of the energy saving mode must be defined in the ETS.
Secondly, it is possible to change automatically to the energy saving mode if an operation no longer occurs within a defined time period (including the extension). The time for this case is defined in the ETS. Each operation or status change of the signals at the extension inputs restarts the time for activating the energy saving mode.

If the energy saving mode is to be activated via the communication object and an operation takes place on the device at this time (via the rotary knob, push-button or extension inputs), the activation of the energy saving mode is then delayed until the end of the control operation. This ensures that the operating functions are still executed properly until the end and all necessary telegrams are transmitted to the bus.
The energy saving mode is never activated while extension inputs or the programming mode are transmitting cyclically!

i On activation of energy-saving mode, the acoustic signal transmitter and the Status LED of the device are switched off under forced control. An acoustic signal with low or medium priority, which was active before the energy saving mode and aborted or should be activated during the energy saving mode, is not executed again or recovered automatically on deactivation of the energy saving mode. The buzzer must first be reactivated before it executes an acoustic signal again.
Exception: The device will not activate the energy saving mode while an alarm function (high priority) is signalled by the buzzer! If the device should activate the energy saving mode during an active alarm message, the execution of the energy saving mode will be delayed until the end of the alarm message. The device ignores telegrams for activation of the alarm function, however, if the energy saving mode was already activated previously. Thus, an object update of the alarm function during the energy saving mode will not cause the alarm function to be executed. Just like in the case of signalling with a lower priority, an alarm function that was active before the energy saving mode and aborted or should be activated during the energy saving mode, is not executed again or recovered automatically on deactivation of the energy saving mode. Here, too, the alarm object must first be reactivated.
Display functions for Status LEDs, which were active before energy-saving mode (e.g. status displays), are first executed unchanged when energy-saving operation is deactivated. New control of the objects of the display functions must then take place for the Status LEDs to signal a current status, or possibly a different one.

i The communication object of the energy saving mode can either be used just for activation, or alternatively just for deactivation, or if required, for the combined activation and deactivation, too. In all cases, the telegram polarity can be configured in the ETS. Only different polarities can ever be configured (e.g. "0" = mode inactive / "1" = mode active) for the combined activation and deactivation.

- Any activation attempts of the energy saving mode are ignored while the programming mode of the device is active. The device stores the activation attempt and executes the energy saving mode once the programming mode is terminated by pressing the programming button. If the device is programmed by the ETS (physical address and/or application program) in an active programming mode, the device does not then execute the energy saving mode automatically at the end of the programming operation.

Deactivating energy saving mode

The device also has two different options for deactivation of the energy saving mode, which can either be combined together or used separately. Firstly, the energy saving mode can be deactivated by a group telegram via the communication object designated for this purpose. For this purpose, the telegram polarity that triggers the deactivation of the energy saving mode must be defined in the ETS. Secondly, it is possible to deactivate the energy saving mode automatically as soon as the rotary knob or push-button are operated.
If an operation of the push-button or rotary knob deactivates the energy saving mode, the device always executes the configured operating function immediately as well (e.g. switching, dimming...).

During the energy saving mode, the extension inputs have no function. The extensions cannot be used to terminate the energy saving mode. If the energy saving mode is deactivated by one of the above events, the device needs approx. 100 milliseconds to detect a change of the signal statuses on the extension inputs. If the device detects a change of the status compared to the status that was last active before the energy saving mode (e.g. status change during the energy saving mode), then the configured signal edges reaction is executed immediately. Otherwise, the extensions will not react particularly to the deactivation of the energy saving mode.

- The communication object of the energy saving mode can either be used just for activation, or alternatively just for deactivation, or if required, for the combined activation and deactivation, too. In all cases, the telegram polarity can be configured in the ETS. Only different polarities can ever be configured (e.g. "0" = mode inactive / "1" = mode active) for the combined activation and deactivation.
- The device will activate the energy saving mode even if the push-button, rotary knob or extension inputs are disabled. On cancelling the energy saving mode, the device reactivates the previously active disabling functions so that the push-button, rotary knob or extension inputs can still remain disabled. It is not necessary here to reactivate the disabling functions after cancelling the energy saving mode.
  The energy saving mode (first operation) can also be deactivated by a disabled push-button or rotary knob. The configured operating functions (switching, dimming...) will not be executed thereby, however.
- Programming connections to the device, broadcast telegrams or pressing of the programming button cause the energy saving mode to be deactivated automatically.

4.2.4.8 Delivery state

In the delivery state, the device reacts to operations, but does not send any telegrams to the bus. Operations of the rotary knob and push-button cause the integrated buzzer to output an operation tone thereby enabling the device to be easily tested for function. During a clockwise rotary knob movement, a signal tone is output at the highest volume for the duration of one second. Immediately afterwards, 3 more signal tones with decreasing volume follow with a duration of 0.5 seconds each. During an anticlockwise rotary knob movement, the volume of the acoustic signal is increased. The device then outputs a signal tone at the lowest volume for the duration of one second. Immediately afterwards, 3 more signal tones with increasing volume follow each with a duration of 0.5 seconds.
During an operation of the push-button, the signal transmitter outputs a short tone.
The extension inputs of the device have no function in the delivery state.

If the rotary sensor has not yet been programmed with application data by the ETS, the Status LEDs flash at a slow rate in an alternating pattern (approx. 0.75 Hz). The same happens if the device is unloaded by the ETS. In this case, the delivery state described above cannot be restored. An unloaded device no longer reacts to operations.

After programming in the ETS, the described behaviour of the delivery state is no longer active. The device then behaves according to the configuration.

4.2.5 Parameters

4.2.5.1 Parameter push-button / rotary knob

Description	Values	Comment
☐↵ Push-button (PB) / Rotary knob (RK)		
Use LED display function?	yes **no**	If the Status LEDs are to be used for display tasks, this parameter must be set to "Yes". The parameter pages "PB Status LED" and "RK Status LED" then become visible and contain further LED parameters. In the case of "No", the Status LEDs are permanently deactivated for display tasks. Both Status LEDs are then only activated when there is an active alarm message. If the LED display functions are required, then special design covers with light guides must be used. ⓘ The LED display function can only be configured and used with Version 1.2 of the application program! If Version 1.1 of the application program is used, the Status LEDs are only activated when alarm signalling is active.
Light period of status LED for button-press indicator	1 sec 2 sec **3 sec** 4 sec 5 sec	This parameter defines the light period of both Status LEDs for the LED function "Button-press display". This parameter is only visible if the LED display function is enabled.
Use buzzer signalling function ?	yes **no**	If the internal buzzer of the device is to be used for signalling tasks, this parameter must be set to "yes". The parameter page "PB/RK buzzer" containing additional parameters of the buzzer will then be displayed. If "no" is selected, the buzzer is deactivated permanently.
Disabling function	**disabled** enabled	With this parameter, the disabling function of the push-button and rotary knob can be activated centrally.
Polarity of disabling object	**disable = 1 / enable = 0** Disable = 0 / enable = 1	This parameter defines the value of the disabling object at which the disabling function is active.

Disabling function affects	only rotary knob only push-button **Push-button and Rotary knob**	This parameter defines whether just the push-button, just the rotary knob or push-button and rotary knob are disabled similarly by a telegram to the disabling object. The parameter and object structure of the disabling function also adjusts itself according to the selection. The disabling behaviour for push-button and rotary knob can be configured independently of each other.
Reaction of the rotary knob at the beginning of the disabling function		If the disabling function is used for the rotary knob, the reaction on activation and deactivation of the disabling function can be preset here. This parameter is only visible if the disabling function affects the rotary knob!
	no reaction	The rotary knob shows no reaction at the beginning of disabling. The sensor only adopts the state as provided for by the "Behaviour during disabling".
	Reaction as rotating in clockwise direction Reaction as rotating in anticlockwise direction	At the beginning of disabling, the rotary knob executes the function it has in non-disabled state. The configuration of the rotary knob is then executed as intended for normal operation according to the direction of rotation. The telegrams are transmitted to the bus via the communication object of the rotary knob.
	Reaction as disabling function operation in clockwise direction Reaction as disabling function operation in anticlockwise direction	The rotary knob executes the function specified by the disabling function of the rotary knob according to the direction of rotation. The disabling function is a rotary knob function with independent communication objects and independent parameters on the parameter page "RK - disabling function". The setting possibilities available for this disabling function are the same as for the rotary knob itself.
Behaviour of the rotary knob during disabling		Regardless of the behaviour at the beginning or end of disabling, the rotary knob can be influenced separately during disabling. This parameter is only visible if the disabling function affects the rotary knob!
	no reaction	The rotary knob is completely disabled during disabling. An operation has no effect.
	like rotary knob disabling function	The rotary knob behaves as specified by the configuration of the disabling function. The telegrams are transmitted to the bus via the communication objects of the disabling function.

Reaction of the rotary knob at the end of the disabling function		If the disabling function is used for the rotary knob, the reaction on activation and deactivation of the disabling function can be preset here. This parameter is only visible if the disabling function affects the rotary knob!
	no reaction	The rotary knob shows no reaction at the end of disabling.
	Reaction as rotating in clockwise direction Reaction as rotating in anticlockwise direction	At the end of disabling, the rotary knob executes the function it has in the non-disabled state. The configuration of the rotary knob is then executed as intended for normal operation according to the direction of rotation. The telegrams are transmitted to the bus via the communication object of the rotary knob.
	Reaction as disabling function operation in clockwise direction Reaction as disabling function operation in anticlockwise direction	The rotary knob executes the function specified by the disabling function of the rotary knob according to the direction of rotation. The disabling function is a rotary knob function with independent communication objects and independent parameters on the parameter page "RK - disabling function". The setting possibilities available for this disabling function are the same as for the rotary knob itself.
Reaction of the push-button at the beginning of the disabling function		If the disabling function is used for the push-button, the reaction on activation and deactivation of the disabling function can be preset here. This parameter is only visible if the disabling function affects the push-button!
	no reaction	The rotary knob shows no reaction at the beginning of disabling. The sensor only adopts the state as provided for by the "Behaviour during disabling".
	Reaction as push-button on pressing Reaction as push-button on releasing	At the beginning of disabling, the push-button executes the function it has in the non-disabled state. The configuration of the push-button is then executed as intended for normal operation. The telegrams are transmitted to the bus via the communication object of the push-button.
	Reaction as disabling function push-button on pressing Reaction as disabling function push-button on releasing	The push-button executes the function specified by the disabling function of the push-button. The disabling function is an internal button function with independent communication objects and independent parameters on the parameter page "PB - disabling function". The setting possibilities available for this disabling function are the same as for the push-

		button itself.
Behaviour of the push-button during disabling		Regardless of the behaviour at the beginning or end of disabling, the push-button can be influenced separately during disabling. This parameter is only visible if the disabling function affects the push-button!
	no reaction	The push-button is completely disabled during disabling. An operation has no effect.
	like push-button disabling function	The push-button behaves as specified by the configuration of the disabling function. The telegrams are transmitted to the bus via the communication objects of the disabling function.
Reaction of the push-button at the end of the disabling function		If the disabling function is used for the push-button, the reaction on activation and deactivation of the disabling function can be preset here. This parameter is only visible if the disabling function affects the push-button!
	no reaction	The push-button shows no reaction at the end of disabling.
	Reaction as push-button on pressing Reaction as push-button on releasing	At the end of disabling, the push-button executes the function it has in the non-disabled state. The configuration of the push-button is then executed as intended for normal operation. The telegrams are transmitted to the bus via the communication object of the push-button.
	Reaction as disabling function push-button on pressing Reaction as disabling function push-button on releasing	The push-button executes the function specified by the disabling function of the push-button. The disabling function is an internal button function with independent communication objects and independent parameters on the parameter page "PB - disabling function". The setting possibilities available for this disabling function are the same as for the push-button itself.

□↵ PB - General

Function	no function **Switching** Dimming Venetian blind Value transmitter 1-byte 2-byte value transmitter Scene extension 2-channel operation	This parameter is used to define the basic function of the push-button. Depending on this choice, the ETS displays different communication objects and parameters.

The following parameters are visible for the function "Switching"...

Command on pressing the button	no reaction ON OFF **TOGGLE**	These parameters specify the reaction when the button is pressed or released.
Command on releasing the button	**no reaction** ON OFF TOGGLE	

The following parameters are visible for the function "Dimming"...

Command on pressing the button	Brighter (ON) Darker (OFF) **Brighter / darker (TOGGLE)** Brighter (TOGGLE) Darker (TOGGLE)	This parameter defines the reaction when the button is pressed. If the push-button is to toggle on a brief press, the corresponding switching objects of other sensors with the same function must be linked with one another. In the "Brighter/darker (TOGGLE)" setting, the dimming objects must be interlinked as well so that the correct telegram can be transmitted on the next button-press.
Time between switching and dimming (100...50000 x 1 ms)	100...**400**...50000	This parameter defines how long the button must be pressed for the pushbutton sensor to transmit a dimming telegram.
Advanced parameters	**deactivated** activated	When the advanced parameters are activated, the ETS shows the following parameters.
Advanced parameters activated...		
Increase brightness by	1.5 % 3 % 6 % 12.5 % 25 % 50 % **100 %**	This parameter sets the relative dimming level when the brightness is increased. On each button-press, the brightness is changed at maximum by the configured step width. Especially with smaller dimming levels it is advisable for the push button sensor to repeat the dimming telegrams automatically (see "telegram repetition").
Reduce brightness by	1.5 % 3 % 6 % 12.5 % 25 %	This parameter sets the relative dimming level when the brightness is reduced. On each button-press, the brightness is changed at maximum by the configured step width.

	50 % **100 %**	Especially with smaller dimming levels it is advisable for the push button sensor to repeat the dimming telegrams automatically (see "telegram repetition").
Transmit stop telegram?	**yes** no	On "Yes" the push-button transmits a telegram for stopping the dimming process when the rocker is released. When the push-button transmits telegrams for dimming in small increments, the stop telegram is generally not needed.
Telegram repeat?	yes **no**	This parameter can be used to activate telegram repetition for dimming. The push-button will then transmit the relative dimming telegrams (in the programmed step width) until it is released.
Time between two telegrams	**200 ms** 300 ms 400 ms 500 ms 750 ms 1 sec 2 sec	This parameter defines the interval at which the dimming telegrams are automatically repeated in the telegram repetition mode. This parameter is visible only if "Telegram repetition = yes"!

The following parameters are visible for the function "Venetian Blind"...

Command on pressing the button	no reaction DOWN UP **TOGGLE**	This parameter defines the running direction of a drive after a button-press. If the setting is "TOGGLE", the direction is changed after each long time command. If several push buttons are to control the same drive, the long time objects of the push buttons must be interlinked for a correct change of the running direction.
Operation concept	**short – long – short** long – short short – long long – short or short	For Venetian blind control, four different operation concepts can be selected. For these concepts, the ETS shows further parameters.
Time between short-time and long-time	1...**4**...3000	This parameter sets the time after which the long-time operation will be evaluated on pressing the button.

command (1...3,000 x 100 ms)		This parameter is not visible with "Operation concept = long – short"!
Slat adjusting time (0...3,000 x 100 ms)	0 … **5** … 3000	During the slat adjustment time, a transmitted MOVE telegram can be terminated by releasing the button (STEP). This function serves to adjust the slats of a blind. This parameter is not visible with "Operation concept = long – short"!

The following parameters are visible for the function "Value transmitter 1 byte"...

Function	**Value transmitter 0...255** Value transmitter 0…100 %	If the push-button is configured as "1-byte value transmitter", values can be transmitted as integers from 0 to 255 or as a percentage from 0 % to 100 % during a button-press. The following parameters and their settings depend on this distinction.
Value (0...255)	**0**...255	This parameter defines the object value when the button is pressed. Visible only if "Function = 0...255"!
Value (0...100 %)	**0**...100	This parameter defines the object value when the button is pressed. Visible only if "Function = 0...100 %"!
Value adjustment by long button-press	**disabled** enabled	If value adjustment by long button-press is enabled, the ETS shows further parameters. Value adjustment begins, when the button is held down for more than 5 s.
Starting value in case of value adjustment		Value adjustment can begin with different starting values.
	same as configured value	After each long press, the device always starts with the value configured in the ETS.
	same as value after last adjustment	After a long press, the device starts with the value transmitted by itself as the last value.
	same as value from communication object	After a long press, the device starts with the value transmitted by itself or by another device with this group address as the last value. This parameter is only visible if "Value adjustment by long button-press = enabled"!

Direction of value adjustment	upwards downwards **toggling (alternating)**	With a long press, the device can either vary the values always in the same direction or it stores the direction of the last adjustment and reverses it on the next button-press. This parameter is only visible if "Value adjustment by long button-press = enabled"!
Step width (1 … 15)	1...**15**	In a value adjustment, the device determines the new telegram value from the previous value and the preset step width. If the value falls below the lower limit of the adjustment range (0 or 0 %) or if it exceeds the upper limit (255 or 100%), the device adapts the step width of the last step automatically. This parameter is only visible if "Value adjustment by long button-press = enabled"!
Time between two telegrams	**0.5 sec** 1 sec 2 sec 3 sec	This parameter defines the time between two value telegrams during a continuous value adjustment. This parameter is only visible if "Value adjustment by long button-press = enabled"!
Value adjustment with overflow	yes **no**	If value adjustment is to be effected without overflow (setting "No") and if the device reaches the lower limit of the adjustment range (0 or 0 %) or the upper limit (255 or 100 %) during value adjustment, the adjustment will be stopped automatically by the sensor. If the value adjustment with overflow is programmed (setting "Yes") and if the device reaches the lower or the upper limit, it will transmit the value of this range limit and then add a pause the duration of which corresponds to two levels. Thereafter, the device transmits a telegram with the value of the other range limit and continues the value adjustment in the same direction.

The following parameters are visible for the function "Value transmitter 2 byte"...

Function	**Temperature value transmitter** Brightness value transmitter	If the push-button is configured as "2-byte value transmitter", the values to be transmitted can be formatted and transmitted as temperature values (0 °C to 40 °C), as brightness values

	Value transmitter (0...65535)	(0 lux to 1500 lux) or as integers (0 to 65535). The following parameters and their settings depend on this selection.
Temperature value (0...40 °C)	0...**20**...40	This parameter defines the object value when the button is pressed. This is only visible if "Function = Temperature value transmitter"!
Brightness value	0, 50...**300**...1450, 1500 lux	This parameter defines the object value when the button is pressed. This is only visible if "Function = Brightness value transmitter"!
Value (0...65535)	**0**...65535	This parameter defines the object value when the button is pressed. This is only visible if "Function = Value transmitter (0...65535)"!
Value adjustment by long button-press	**disabled** enabled	If value adjustment by long button-press is enabled, the ETS shows further parameters. Value adjustment begins, when the button is held down for more than 5 s.
Starting value in case of value adjustment		Value adjustment can begin with different starting values.
	same as configured value	After each long press, the device always starts with the value configured in the ETS.
	same as value after last adjustment	After a long press, the device starts with the value transmitted by itself as the last value.
	same as value from communication object	After a long press, the device starts with the value transmitted by itself or by another device with this group address as the last value. This setting selectable only if "Function = Value transmitter (0...65535)"! This parameter is only visible if "Value adjustment by long button-press = enabled"!
Direction of value adjustment	upwards downwards **toggling (alternating)**	With a long press, the device can either vary the values always in the same direction or it stores the direction of the last adjustment and reverses it on the next button-press. This parameter is only visible if "Value adjustment by long button-press =

		enabled"!
Step width	**1 °C**	For temperature values, the step width of the adjustment is fixed to 1°C. This parameter is only visible if "Function = Temperature value transmitter" and "Value adjustment by long button-press = enabled"!
Step width	**50 lux**	For brightness values, the step width of the adjustment is fixed to 50 lux. This parameter is only visible if "Function = Brightness value transmitter" and "Value adjustment by long button-press = enabled"!
Step width	1 2 5 10 20 50 75 100 200 500 750 **1000**	This parameter sets the step width of the value adjustment for the 2-byte value transmitter. This parameter is only visible if "Function = Temperature value transmitter" and "Value adjustment by long button-press = enabled"!
Time between two telegrams	0.5 sec **1 sec** 2 sec 3 sec	This parameter defines the time between two value telegrams during a continuous value adjustment. This parameter is only visible if "Value adjustment by long button-press = enabled"!
Value adjustment with overflow	yes **no**	If value adjustment is to be effected without overflow (setting "No") and if the device reaches the lower limit of the adjustment range (0 °C, 0 or Lux, 0) or the upper limit (+ 40 °C, 1500 Lux, 65535) during value adjustment, the adjustment will be stopped automatically by the sensor. If the value adjustment with overflow is programmed (setting "Yes") and if the device reaches the lower or the upper limit, it will transmit the value of this range limit and then add a pause the duration of which corresponds to two levels. Thereafter, the device transmits a telegram with the value of the other range limit and continues the value adjustment in the same direction.

The following parameters are visible for the function "Scene extension"...

Function	**Scene extension without storage function** Scene extension with storage function	This parameter defines the functionality of the extension. If the push-button is used as a scene extension, the scenes can either be stored in one or in several other KNX/EIB devices (e.g. light scene push-button sensor). During a scene recall or in a storage function, the device transmits a telegram with the respective scene number via the extension object of the push-button.
Scene number (1 … 64)	**1**...64	In accordance with the KNX standard, objects with data type 18.001 "Scene Control" can recall or store up to 64 scenes by their numbers. The parameter defines the scene number to be transmitted when the button is pressed.

The following parameters are visible for the function "2-channel operation"...

Operation concept	**Channel 1 or channel 2** Channel 1 and channel 2	This parameter defines the 2-channel operation concept. If the setting "channel 1 or channel 2" is selected, the device decides dependent on the button-press duration which of the channels will be used. If the setting "Channel 1 and channel 2" is selected, the push-button transmits only the telegram of channel 1 on a short button-press and both telegrams on a sustained button-press.
Function channel 1 (2)	no function **Switching (1 bit)** Value transmitter 0...255 (1 byte) Value transmitter 0…100 % (1-byte) Temperature value transmitter (2-byte)	This parameter defines the channel function and specifies which other parameters and which communication object are to be displayed for channel 1 (2).
Command of button for channel 1 (2)		This parameter defines the object value transmitted to the bus when the button is

	ON OFF **TOGGLE**	pressed. This is only visible if "Function channel 1 (2) = Switching (1 bit)"!
Value of the button for Channel 1 (2) (0...255)	**0**...255	This parameter defines the object value transmitted to the bus when the button is pressed. It is only visible if "Function channel 1 (2) = Value transmitter 0...255 (1 byte)"!
Value of the button for Channel 1 (2) (0...100 %)	**0**...100	This parameter defines the object value transmitted to the bus when the button is pressed. It is only visible if "Function channel 1 (2) = Value transmitter 0...100% (1 byte)"!
Temperature value of the button for channel 1 (2) (0 … 40 °C)	0...**20**...40	This parameter defines the temperature value transmitted to the bus when the button is pressed. It is only visible if "Function channel 1 (2) = Temperature value transmitter (2 bytes)"!
Time between channel 1 and channel 2 (1...255 x 100 ms)	0...**30**...255	Depending on the selected operation concept, this parameter defines the interval at which the push button transmits the telegram for channel 1 and the telegram for channel 2 when the button is pressed.

□↵ PB LED (Only visible when the LED display function is enabled on the application program of Version 1.2!)

Function		The rotary sensor has a red Status LED, which is assigned to the push-button. The Status LED can execute various display functions, provided that its use is generally enabled on the parameter page "Push-button (PB) / Rotary knob (RK)". The LED display function can only be configured and used with Version 1.2 of the application program! This parameter is not available when Version 1.1 of the application program is being used. The Status LEDs are then only activated when an active alarm is signalling.
	always OFF	In this configuration, the Status LED remains permanently switched off. Special case: In this setting, the Status LED displays adjustments of the transmission values in the "Value transmitter" push-button function,

		provided that this function has been enabled in the ETS and is executed by the operator. The LED then lights up briefly when a new value adjustment telegram is transmitted.
	always ON	In this configuration, the Status LED remains permanently switched on. Permanently switched-on Status LEDs can be used, for example, for orientation lighting. Special case: In this setting, the continuous light is interrupted for the length of the value adjustment (function: value transmitter with adjustment function for the push-button). The LED lights up briefly for each adjustment value transmitted to the bus.
	Button-press display	If the Status LED is working as a button-press display, it lights up when the push-button is pressed and released (exception: Scene extension with memory function: Here, after short operations, the LED only lights up on release). In addition, the LED signals to the push-button when a storage telegram is being transmitted in the function "Scene extension". In addition, in the "Value transmitter" function, the LED displays the transmission of a value adjustment telegram. The light period of the button-press display can generally be set in the ETS using the "Light period of the Status LED for button-press display" parameter. In contrast to this, the signal duration of the display for a scene storage telegram (approx. 3 seconds) and the value adjustment (250 milliseconds) is permanently defined.
	Telegram acknowledgment	As an alternative to the button-press display, the telegram acknowledgment can then be configured. The telegram acknowledgment only signals the transmission of telegrams in the function "2-channel operation" (fixed display period 250 milliseconds). Other operations of the rotary knob or push-button are not displayed after the telegram acknowledgement.
	Status indication	Irrespective of the configuration of the push-button, the status LED can indicate the state of a separate LED communication object. Here, the LED can be switched on or off statically via the 1-bit object value received. In this setting, the object value is not displayed in inverted form by the LED (Object = "0" -> LED = OFF / Object = "1" -> LED = ON).

	inverted status display	Irrespective of the configuration of the push-button, the status LED can indicate the state of a separate LED communication object. Here, the LED can be switched on or off statically via the 1-bit object value received. In this setting, the object value is displayed in inverted form by the LED (Object = "0" -> LED = ON / Object = "1" -> LED = OFF).

☐┤ PB - Disabling function (visible only if the disabling function is enabled!)

The disabling function has the same configuration options as the push-button itself (see Push-button).

☐┤ RK - General

Function	no function **Switching** Dimming Venetian blind Value transmitter 1-byte 2-byte value transmitter Scene extension	The basic function of the rotary knob is defined here. Depending on this choice, the ETS displays different communication objects and parameters.

The following parameters are visible for the function "Switching"...

Separate objects each direction of rotation ?	yes **no**	The rotary function "Switching" allows 1-bit switching telegrams to be transmitted to the bus in order to activate a lighting system, for example. Depending on the movement of the rotary knob, different control commands can be transmitted to the bus via a communication object (setting "no"). Alternatively, separate objects can be assigned to both directions of rotation (setting "yes") thereby enabling two different actuation channels to be activated with just one operating element .
Command on turning in clockwise direction	no reaction **ON** OFF TOGGLE	Depending on the movement of the rotary knob, different control commands (ON, OFF, TOGGLE) can be transmitted to the bus. This parameter determines the reaction when the rotary knob is turned in anticlockwise direction.
Command on turning in anti-clockwise direction	no reaction ON **OFF** TOGGLE	Depending on the movement of the rotary knob, different control commands (ON, OFF, TOGGLE) can be transmitted to the bus. This parameter determines the reaction when the rotary knob is turned in anticlockwise direction.

Time for standstill after each operation	**300ms** 500 ms 1 sec 2 sec	The device differentiates between different operations based upon the time that the rotary knob stands still after a completed operation. This standstill time is configured here and should not be selected too short in order to avoid unintended switching operations - particularly during fast operations. If the device detects additional operations immediately after a rotary movement (time not yet elapsed), it then ignores the continuing movement of the rotary knob. The time for standstill detection is retriggered for each rotary knob movement.

The following parameters are visible for the function "Dimming"...

Operation concept		The rotary knob function "Dimming" differentiates between four different operation concepts.
	Dimming without OFF telegram	This operation concept only outputs relative dimming commands with a step width of 100% during a rotary knob movement. Stop telegrams stop a dimming process at the end of the operation. It is thus possible to set any brightness values of a lighting system, for example. Switching telegrams are not transmitted by the rotary knob to the actuator in this configuration.
	Dimming with OFF telegram	This operation concept functions in the dimming process just like the concept "Dimming without OFF telegram", the only difference being that the device can also switch off the activated actuator by means of a rotary knob operation. Since this operation concept performs switching and dimming, it can be used autonomously without any additional operating elements.
	Dimming Comfort without OFF telegram	This operation concept supports the operation of the rotary knob for dimming dependent on speed and rotation angle. Here, depending on the speed of rotation, relative dimming is possible by small and large step widths, thereby allowing the brightness of a lighting system to be set finely and gradually. Switching telegrams are not transmitted by the rotary knob to the actuator in this concept.
	Dimming Comfort with OFF telegram	This operation concept functions in the dimming process just like the concept "Dimming Comfort without OFF

		telegram", the only difference being that the device can also switch off the activated actuator by means of a rotary knob operation. Since this operation concept performs switching and dimming, it can be used autonomously without any additional operating elements.
Command on turning / rotation direction	Clockwise: brighter ON / anticlockwise: darker OFF **Clockwise: Darker OFF / anticlockwise: brighter ON**	When using the rotary knob function "Dimming", it is possible to dim or optionally switch lighting systems by activating dimmer actuators. Likewise, KNX speed controllers can be addressed whereby motors can be switched on and off and the speed changed. This parameter specifies the switching and dimming command (lighter ON / darker OFF) for the operating direction of the rotary knob movement (clockwise or anticlockwise).
Dimming step width Dim brighter/darker by	100 %	When operating the rotary knob, a 4-bit dimming telegram (relative dimming) with a step width of 100 % is already transmitted after the first notch (minimum rotation angle) with the operation concepts "Dimming without OFF telegram" and "Dimming with OFF telegram". By using the maximum dimming step width, the entire brightness range can be operated. As soon as the rotary knob is no longer operated, the device transmits a stop telegram after the configurable "Time for standstill after each operation" in the ETS has elapsed, which stops the dimming process. This parameter is only visible with the operation concepts "Dimming without OFF telegram" and "Dimming with OFF telegram".
Dimming step width Dim brighter/darker by	1.5 % 3 % **6 %**	The operation concept "Dimming Comfort without OFF telegram" and "Dimming Comfort with OFF telegram" allow the operation of the rotary knob dependent on speed and rotation angle in order to transmit relative dimming commands. Here, depending on the speed of rotation, relative dimming is possible by small and large step widths. During a slow operation (notch by notch), the rotary knob transmits dimming commands to the actuator in a small step width. This step width is configured by this parameter. This parameter is only visible with the

		operation concepts "Dimming comfort without OFF telegram" and "Dimming comfort with OFF telegram".
Time for standstill after each operation	**300ms** 500 ms 1 sec 2 sec	The device differentiates between different operations based upon the time that the rotary knob stands still after a completed operation. This standstill time is configured here and should not be selected too short in order to avoid unintended switching operations - particularly during fast operations. If the device detects additional operations immediately after a rotary movement (time not yet elapsed), it then ignores the continuing movement of the rotary knob. The time for standstill detection is retriggered for each rotary knob movement.

The following parameters are visible for the function "Venetian Blind"...

Operation concept	**Move-Step**	The rotary knob supports the operation concept "Move - Step" in the blind function. Here, the rotation angle of the rotary knob (number of notches during a rotary movement) is evaluated during an operation in order to distinguish between an operation for the blind/shutter movement (MOVE, UP, DOWN) or slat adjustment (MOVE -> STEP).
Command on turning / rotation direction	**Clockwise: DOWN / anticlockwise: UP** Clockwise: UP / anticlockwise: DOWN	This parameter determines the movement direction command (raise / open slats, lower / close slats) for the operating direction of the rotary knob movement (clockwise or anticlockwise).
Maximum rotation angle for slat adjustment	**45° (approx. 1/8 rotation, 4 notches)** 90° (approx. 1/4 rotation, 7 notches) 180° (approx. 1/2 rotation, 15 notches) 270° (approx. 3/4 rotation, 22 notches) 360° (complete rotation, 30 notches) 540° (1.5 times rotation,	If the rotary knob stops during an operation within the rotation angle preset here for a slat adjustment, the device immediately transmits a short time telegram (STEP). This function is used for adjusting the slats of a blind. This allows slats to be stopped at any position during their rotation. The parameter "Maximum rotation angle for slat adjustment" must be set to the expected control speed of the rotary knob and to the slat travelling time. Small angles should normally be selected if the operation is slow or the slat travelling time is short. Likewise, large angles of rotation are to be

	45 notches) 720° (2 times rotation, 60 notches)	configured if the control speed is normally faster or the slat travelling time long. If drives for rolling shutters, awnings or windows are activated by the rotary knob function "Venetian blind", i.e. slat control is unnecessary, the rotation angle for the slat adjustment should be set to the smallest angle (45°).
Time for standstill after each operation	**300ms** 500 ms 1 sec 2 sec	The device differentiates between different operations based upon the time that the rotary knob stands still after a completed operation. This standstill time is configured here and should not be selected too short in order to avoid unintended switching operations - particularly during fast operations. If the device detects additional operations immediately after a rotary movement (time not yet elapsed), it then ignores the continuing movement of the rotary knob. The time for standstill detection is retriggered for each rotary knob movement.

The following parameters are visible for the function "Value transmitter 1 byte"...

Function		The rotary knob function "1-byte value transmitter" distinguishes three different functions.
	Value transmitter 0...255	In this function, the rotary knob transmits unformatted values within a range of "0...255" according to the KNX data type 5.010. Such values are normally used for presettings for counter statuses or limiting values. Optionally, a value adjustment can be carried out by adjusting the rotary knob by a defined rotation angle.
	Value transmitter 0…100 %	In this function, the rotary knob transmits formatted values within a range of "0...100%" according to the KNX data type 5.001. Such a value formatting in percentage is normally used for brightness value or position presettings. Optionally, a value adjustment can be carried out by adjusting the rotary knob by a defined rotation angle.
	Value transmitter comfort 0...255	This function supports the operation of the rotary knob for transmitting values dependent on speed and rotation angle. Here, depending on the speed of rotation, a value adjustment is possible by small and large step widths, thereby allowing the brightness of a lighting system to be set finely and gradually.

		The value transmitted is normally unformatted within the value range of "0...255" according to the KNX data type 5.010 in this function.
Function Value adjustment	**disabled** enabled	This parameter distinguishes whether just a value recall takes place and whether a value adjustment is also possible. A value adjustment is always provided with the function "Value transmitter comfort 0…255".
Value on turning in clockwise direction (0...255)	0...**255**	This parameter determines the object value when the rotary knob is turned in clockwise direction It is only visible with "Function = value transmitter 0...255" and only with disabled value adjustment!
Value on turning in anti-clockwise direction (0...255)	**0**...255	This parameter determines the object value when the rotary knob is turned in anticlockwise direction It is only visible with "Function = value transmitter 0...255" and only with disabled value adjustment!
Value on turning in clockwise direction (0...100 %)	0...**100**	This parameter determines the object value when the rotary knob is turned in clockwise direction It is only visible with "Function = value transmitter 0...100%" and only with disabled value adjustment!
Value on turning in anti-clockwise direction (0...100 %)	**0**...100	This parameter determines the object value when the rotary knob is turned in anticlockwise direction It is only visible with "Function = value transmitter 0...100%" and only with disabled value adjustment!
Value on turning (0...255)	0...**255**	This parameter determines the object value when the rotary knob is turned in clockwise or anticlockwise direction It is only visible with "Function = value transmitter 0...255" and only with enabled value adjustment!
Value on turning (0...100 %)	0...**100**	This parameter determines the object value when the rotary knob is turned in clockwise or anticlockwise direction

		It is only visible with "Function = value transmitter 0...100%" and only with enabled value adjustment!
Rotation angle for value adjustment	**approx. 36° (3 notches)** approx. 45° (4 notches) approx. 60° (5 notches) approx. 72° (10 notches)	During a value adjustment, the rotary knob must be turned by a defined number of notches during an operation. This parameter defines the number of notches required for the value adjustment. During an operation of the rotary knob without value adjustment, a 1-byte value telegram is first transmitted after the first notch (minimum rotation angle) regardless of the direction it is turned. The parameter "Starting value in case of value adjustment" defines what value this is (see below). If the number of notches necessary for the value adjustment is exceeded during continuous operation, the device adjusts the value by the preset step width depending on the rotation direction and transmits this to the bus. If the operation still continues, the value is adjusted continuously. This parameter is only visible with "Function = value transmitter 0...255" and "Function = value transmitter 0...100%" and only with enabled value adjustment!
Starting value in case of value adjustment	same as configured value same as value after last adjustment **same as value from communication object**	This parameter defines the original starting value for the adjustment. Adjustment can begin from the value configured in the ETS, from the final value of the last adjustment cycle or from the current value of the communication object. This parameter is only visible with "Function = value transmitter 0...255" and "Function = value transmitter 0...100%" and only with enabled value adjustment!
Starting value in case of value adjustment	**as value from feedback object**	With the Value transmitter comfort 0…255 a value adjustment always starts at the value that is in the feedback object. This parameter is only visible with "Value transmitter comfort 0…255"!
Direction of value adjustment	**Clockwise: upwards / anticlockwise: downwards** Clockwise: downwards /	Here, it is determined whether the values should be increased ("upwards") or reduced ("downwards") depending on the direction of rotation during the value adjustment.

	anticlockwise: upwards	This parameter is only visible on "Function value adjustment = enabled"!
Step width (1 … 15)	1...**15**	This parameter defines the change of the value during adjustment in a positive or negative direction. It is only visible with "Function = value transmitter 0...255" and "Function = value transmitter 0...100%" and only with enabled value adjustment!
Step width (1 … 31)	1...**15**...31	With the value transmitter comfort 0…255 a value adjustment is possible by small and large step widths depending on the speed of rotation. During a fast rotary movement, the size of the step width is also specified by the rotation angle. During an operation, the value in the communication object "Feedback value" is increased or decreased by the effective step width and transmitted again to the bus via the object "value". The effective step width for the value adjustment is obtained from the speed of a rotary knob operation. During a slow operation (notch by notch), the rotary knob constantly transmits values in small step width to the actuator. During a slow, continuous operation, the value is adjusted with each notch by the step width configured here and transmitted via the object "value". This parameter is only visible with "Value transmitter comfort 0…255"!
Value adjustment with overflow	yes **no**	If, during the value adjustment, the device detects that the preset step width will exceed the limits with the next telegram, the device adapts the step width once in such a way that the corresponding limit value is transmitted together with the last telegram. Depending on the setting of this parameter, the device stops the adjustment at this point or inserts a pause consisting of two increments and then continues the adjustment beginning with the other limit value. This parameter is only visible on "Function value adjustment = enabled"! With the "Value transmitter comfort 0…255" no overflow is ever possible (setting "no" is fixed).

Time for standstill after each operation	**300ms** 500 ms 1 sec 2 sec	The device differentiates between different operations based upon the time that the rotary knob stands still after a completed operation. This standstill time is configured here and should not be selected too short in order to avoid unintended switching operations - particularly during fast operations. If the device detects additional operations immediately after a rotary movement (time not yet elapsed), it then ignores the continuing movement of the rotary knob. The time for standstill detection is retriggered for each rotary knob movement.

The following parameters are visible for the function "Value transmitter 2 byte"...

Function		The rotary knob function "2-byte value transmitter" distinguishes three different functions.
	Temperature value transmitter	In this function, the rotary knob transmits formatted 2-byte temperature values within a range of "0...+40°C" according to the KNX data type 9.001. Such values are normally used for basic setpoint temperatures for room temperature controllers. Optionally, a value adjustment can be carried out by adjusting the rotary knob by a defined rotation angle.
	Brightness value transmitter	In this function, the rotary knob transmits formatted 2-byte temperature values within a range of "0...1500 lux" according to the KNX data type 9.004. Such values are normally used for brightness setpoint presettings for constant light regulations. Optionally, a value adjustment can be carried out by adjusting the rotary knob by a defined rotation angle.
	Value transmitter 0...65535	In this function, the device is able to transmit unformatted 2-byte values within a range "0...65535" to the bus according to the KNX data type 7.001. Such values are normally used for the presetting for counter limiting values. Optionally, a value adjustment can be carried out by adjusting the rotary knob by a defined rotation angle.
Function Value adjustment	**disabled** enabled	This parameter distinguishes whether just a value recall takes place and whether a value adjustment is also possible.

Temperature value on turning in clockwise direction (0...40 °C)	0...**20**...40	This parameter determines the object value when the rotary knob is turned in clockwise direction It is only visible with "Function = temperature value transmitter" and only with disabled value adjustment!
Temperature value on turning in anticlockwise direction (0...40 °C)	0...**20**...40	This parameter determines the object value when the rotary knob is turned in anticlockwise direction It is only visible with "Function = temperature value transmitter" and only with disabled value adjustment!
Brightness value on turning in clockwise direction	0, 50...**300**...1450, 1500 Lux	This parameter determines the object value when the rotary knob is turned in clockwise direction It is only visible with "Function = brightness value transmitter" and only with disabled value adjustment!
Brightness value on turning in anticlockwise direction	0, 50...**300**...1450, 1500 Lux	This parameter determines the object value when the rotary knob is turned in anticlockwise direction It is only visible with "Function = brightness value transmitter" and only with disabled value adjustment!
Value on turning in clockwise direction (0...65,535)	**0**...65535	This parameter determines the object value when the rotary knob is turned in clockwise direction It is only visible with "Function = value transmitter 0...65535" and only with disabled value adjustment!
Value on turning in anti-clockwise direction (0...65,535)	**0**...65535	This parameter determines the object value when the rotary knob is turned in anticlockwise direction It is only visible with "Function = value transmitter 0...65535" and only with disabled value adjustment!
Temperature value on turning (0...40 °C)	0...**20**...40	This parameter determines the object value when the rotary knob is turned in clockwise or anticlockwise direction It is only visible with "Function = temperature value transmitter" and only with enabled value adjustment!
Brightness value on turning	0, 50...**300**...1450, 1500 Lux	This parameter determines the object value when the rotary knob is turned in

		clockwise or anticlockwise direction It is only visible with "Function = brightness value transmitter" and only with enabled value adjustment!
Value on turning (0...65,535)	**0**...65535	This parameter determines the object value when the rotary knob is turned in clockwise or anticlockwise direction It is only visible with "Function = value transmitter 0...65535" and only with enabled value adjustment!
Rotation angle for value adjustment	**approx. 36° (3 notches)** approx. 45° (4 notches) approx. 60° (5 notches) approx. 72° (10 notches)	During a value adjustment, the rotary knob must be turned by a defined number of notches during an operation. This parameter defines the number of notches required for the value adjustment. During an operation of the rotary knob without value adjustment, a 2-byte value telegram is first transmitted after the first notch (minimum rotation angle) regardless of the direction it is turned. The parameter "Starting value in case of value adjustment" defines what value this is (see below). If the number of notches necessary for the value adjustment is exceeded during continuous operation, the device adjusts the value by the preset step width depending on the rotation direction and transmits this to the bus. If the operation still continues, the value is adjusted continuously. This parameter is visible only if the value adjustment is enabled!
Starting value in case of value adjustment	**same as configured value** same as value after last adjustment **same as value from communication object**	This parameter defines the original starting value for the adjustment. Adjustment can begin from the value configured in the ETS, from the final value of the last adjustment cycle or from the current value of the communication object (not for temperature and brightness value transmitter). This parameter is visible only if the value adjustment is enabled! The standard setting is dependent on the configured function.
Direction of value adjustment	**Clockwise: upwards / anticlockwise: downwards** Clockwise: downwards / anticlockwise: upwards	Here, it is determined whether the values should be increased ("upwards") or reduced ("downwards") depending on the direction of rotation during the value adjustment. This parameter is only visible on

		"Function value adjustment = enabled"!
Step width	**1 °C**	For temperature values, the step width of the adjustment is fixed to 1°C. This parameter is only visible with "Function = temperature value transmitter" and with enabled value adjustment!
Step width	**50 lux**	For brightness values, the step width of the adjustment is fixed to 50 lux. This parameter is only visible with "Function = brightness value transmitter" and with enabled value adjustment!
Step width	1 2 5 10 20 50 75 100 200 500 750 **1000**	The step width of the value adjustment for the 0...65535 value transmitter is set here. This parameter is only visible with "Function = value transmitter 0...65535" and only with enabled value adjustment!
Value adjustment with overflow	yes **no**	If, during the value adjustment, the device with the function "value transmitter 0...65535" detects that the preset step width will exceed the limits with the next telegram, the device adapts the step width once in such a way that the corresponding limit value is transmitted together with the last telegram. With the temperature or brightness value transmitter it is not necessary to adapt the step width to the range limits based on the permanent step widths. Depending on the setting of this parameter, the device stops the adjustment at this point or inserts a pause consisting of two increments and then continues the adjustment beginning with the other limit value. This parameter is only visible on "Function value adjustment = enabled"!
Time for standstill after each operation	**300ms** 500 ms 1 sec 2 sec	The device differentiates between different operations based upon the time that the rotary knob stands still after a completed operation. This standstill time

		is configured here and should not be selected too short in order to avoid unintended switching operations - particularly during fast operations. If the device detects additional operations immediately after a rotary movement (time not yet elapsed), it then ignores the continuing movement of the rotary knob. The time for standstill detection is retriggered for each rotary knob movement.

The following parameters are visible for the function "Scene extension"...

Function	**Scene extension without storage function**	If the rotary knob is used as a scene extension, scenes stored in other KNX/EIB devices (e.g. light scene push button sensors) can be recalled. During a scene recall, the device transmits a telegram with the respective scene number via the extension object of the rotary knob. It is not possible to save a scene with the rotary knob function "Scene extension".
Scene number on turning in clockwise direction (1 … 64)	**1**...64	In accordance with the KNX standard, objects with data type 18.001 "Scene Control" can recall or store up to 64 scenes by their numbers. The scene number to be transmitted is defined here when the rotary knob is turned in clockwise direction.
Scene number on turning in anticlockwise direction (1 … 64)	1...**2**...64	In accordance with the KNX standard, objects with data type 18.001 "Scene Control" can recall or store up to 64 scenes by their numbers. The scene number to be transmitted is defined here when the rotary knob is turned in anticlockwise direction.
Time for standstill after each operation	**300ms** 500 ms 1 sec 2 sec	The device differentiates between different operations based upon the time that the rotary knob stands still after a completed operation. This standstill time is configured here and should not be selected too short in order to avoid unintended switching operations - particularly during fast operations. If the device detects additional operations immediately after a rotary movement (time not yet elapsed), it then ignores the continuing movement of the rotary knob. The time for standstill detection is retriggered for each rotary knob

movement.

□↵ RK LED (Only visible when the LED display function is enabled on the application program of Version 1.2!)

Function		The rotary sensor has a red Status LED, which is assigned to the rotary knob. The Status LED can execute various display functions, provided that its use is generally enabled on the parameter page "Push-button (PB) / Rotary knob (RK)". The LED display function can only be configured and used with Version 1.2 of the application program! This parameter is not available when Version 1.1 of the application program is being used. The Status LEDs are then only activated when an active alarm is signalling.
	always OFF	In this configuration, the Status LED remains permanently switched off. Special case: In this setting, the Status LED displays adjustments of the transmission values in the "Value transmitter" rotary knob function, provided that this function has been enabled in the ETS and is executed by the operator. The LED then lights up briefly when a new value adjustment telegram is transmitted.
	always ON	In this configuration, the Status LED remains permanently switched on. Permanently switched-on Status LEDs can be used, for example, for orientation lighting.
	Button-press display	If the Status LED is working as a button-press display, it lights up at the start of an operation of the rotary knob. In addition, in the "Value transmitter" function, the LED displays the transmission of a value adjustment telegram. The light period of the button-press display can generally be set in the ETS using the "Light period of the Status LED for button-press display" parameter. In contrast to this, the signal duration of the display of the value adjustment (250 milliseconds) is permanently defined.
	Status indication	Irrespective of the configuration of the rotary knob, the status LED can indicate the state of a separate LED communication object. Here, the LED can be switched on or off statically via the 1-bit object value received. In this setting, the object value is not displayed in inverted form by the LED

		(Object = "0" -> LED = OFF / Object = "1" -> LED = ON).
	inverted status display	Irrespective of the configuration of the rotary knob, the status LED can indicate the state of a separate LED communication object. Here, the LED can be switched on or off statically via the 1-bit object value received. In this setting, the object value is displayed in inverted form by the LED (Object = "0" -> LED = ON / Object = "1" -> LED = OFF).

☐↵ RK - Disabling function (visible only if the disabling function is enabled!)

The disabling function has the same configuration options as the rotary knob itself (see Rotary knob).

☐↵ PB/RK - Buzzer (only visible with enabled buzzer!)

Signalling function		The device has an acoustic buzzer (Piezo signal transmitter) that can be used for acknowledgement or status signalling. Additionally, the integrated buzzer can signal a warning or ring tone, an alarm and an active programming mode.
	Acknowledgement signalling	When the buzzer works as acknowledgement signalling, it outputs a single tone with an adjustable signal duration during an operation of the rotary knob or push-button. In addition, a signal occurs when a storage telegram is transmitted in the function "Scene extension" or when a telegram is transmitted for the value adjustment in the function "value transmitter".
	Telegram acknowledgment	Alternatively, the telegram acknowledgment can be configured for acknowledgement signalling. The telegram acknowledgment only signals the transmission of telegrams in the function "2-channel operation" (signal duration 250 milliseconds), the transmission of a scene storage telegram or the transmission of telegrams for value adjustment (not with "Value transmitter comfort 0…255") in the described signal lengths. Other operations of the rotary knob or push-button are not signalled after the telegram acknowledgement.
	Status signalling (via object) inverted status signalling (via object) pulsating status signalling	As a further alternative to acknowledgement signalling or telegram acknowledgment, it is possible to activate the buzzer as status signalling via a communication object of its own. During the status signalling, it is possible to distinguish whether the buzzer

	(via object) inv. puls. Status signalling (via object)	outputs a single tone or pulsating tone at a frequency of approx. 1 Hz by means of a parameter setting in the ETS.
	Warning/ring tone (via object) Warning/ring tone (via object) + acknowledgem. signal. Warning/ring tone (via object) + telegram acknowledgment.	The device enables the signalling of a warning/ring tone in addition to acknowledgement or status signalling. The warning/ring tone is activated by a separate 1-bit communication object. A warning/ring tone can be combined in the ETS with an acknowledgement signal, or alternatively, with a telegram acknowledgment. In this case, the warning/ring tone has a higher priority.
Acknowledgement signalling	0.1 sec 0.3 sec 0.5 sec 0.7 sec **1 sec** ... 10 sec	This parameter specifies the duration of acknowledgement signalling. It is only visible if acknowledgement signalling is to take place.
Status signalling	0.1 sec 0.3 sec 0.5 sec 0.7 sec **1 sec** ... 10 sec	This parameter specifies the duration of status signalling. It is only visible if status signalling is to take place.
Warning/ring tone	0.1 sec 0.3 sec 0.5 sec 0.7 sec ... **2 sec** ... 10 sec	This parameter specifies the duration of a warning/ring tone. It is only visible if a warning/ring tone is to be signalled.
Volume 1	mute (OFF) **Level 1 (quiet)** Level 2 Level 3 Level 4 (loud)	The buzzer can output signal tones at different volumes. The volume for the function-dependent signals and warning/ring tone can be differentiated into two settings (volume 1, volume 2) and switched over by a 1-bit communication object during regular operation of the device. In this way, for instance, adaptation to local conditions or a change-over from day to night (loud <-> quiet) is possible. The volume can be set at up 5 different levels. A setting between "level 1 (quiet)" and

		"level 4 (loud)". The level "mute (OFF)" deactivates the buzzer at the selected volume. This parameter defines the volume 1.
Volume 2	**mute (OFF)** Level 1 (quiet) Level 2 Level 3 Level 4 (loud)	The buzzer can output signal tones at different volumes. The volume for the function-dependent signals and warning/ring tone can be differentiated into two settings (volume 1, volume 2) and switched over by a 1-bit communication object during regular operation of the device. In this way, for instance, adaptation to local conditions or a change-over from day to night (loud <-> quiet) is possible. The volume can be set at up 5 different levels. A setting between "level 1 (quiet)" and "level 4 (loud)". The level "mute (OFF)" deactivates the buzzer at the selected volume. This parameter defines the volume 2.
Alarm volume	mute (OFF) Level 1 (quiet) Level 2 Level 3 **Level 4 (loud)**	This parameter specifies the volume of the alarm tone. This parameter is only visible if the alarm function is enabled!
Object polarity for volume switch-over	**"0" = Volume 1 /** **"1" = Volume 2** "0" = Volume 2 / "1" = Volume 1	This parameter defines the telegram polarity of the object for switching over volume.
Alarm function	**disabled** enabled	The device permits signalling of a alarm which might be, for instance, a burglar or a fire alarm from a KNX central alarm unit. If the alarm message has been activated, the buzzer outputs a pulsating tone at a frequency of approx. 2 Hz at a volume configurable separately for the alarm message. In addition, the red diagnostic LEDs flash at the same frequency. The signalling of an alarm can be enabled separately by this parameter.
Object polarity "alarm message"	**"1" = Alarm /** **"0" = Resetting alarm** "0" = Alarm / "1" = Resetting alarm	This parameter defines the telegram polarity of the "Switch alarm". When the object value corresponds to the "Alarm" state, the buzzer outputs the alarm tone. The alarm function then overrides acoustic signalling with lower priority.

		The buzzer only executes signalling with lower priority again as intended after the alarm signalling function has been deactivated.
Reset alarm message by operation ?	**yes** no	If this parameter is set to "yes", an active alarm message can be deactivated by operating the rotary knob or pressing the push-button. This does not cause the configured operating function to be executed. The device only executes the intended operating function after a subsequent operation (Switching, dimming...). If "no" has been selected, an alarm message can only be deactivated via the object "Switch alarm". An operation on the device always executes the configured button function immediately.
Use the alarm acknowledge object?	yes **no**	If alarm signalling can be deactivated by a button-press, this parameter defines whether an additional alarm acknowledge telegram is to be transmitted to the bus via the separate object "Alarm signalling acknowledge" after triggering by this button-press. A telegram can, for instance, be sent via this object to the "Alarm signalling" objects of other push button sensors in order to reset the alarm status there as well (observe the polarity of the acknowledge object!).
Acknowledge alarm signalling by	**ON telegram** **OFF telegram**	This parameter sets the polarity of the object "Acknowledge alarm". This parameter presetting depends on the selected polarity of the object "Switch alarm".

4.2.5.2 Extension inputs parameter

Description	Values	Comment
☐↵ Extension inputs (E)		
Delay after bus voltage return Minutes (0...59)	**0**...59	It is possible to specify separately for each input whether a reaction should take place after a device reset (bus voltage return or ETS programming operation). This means that a defined telegram can be transmitted to the bus according to the input signal or with forced control. The delay time for the extension inputs configurable at this point must have elapsed fully by the time the set reaction is executed. Within the delay, any pending edges or signals at the inputs are not evaluated and are ignored. Minute setting of the delay time for the extension inputs.
Seconds (0...59)	0...**17**…59	Second setting of the delay time for the extension inputs.
Debounce time (10...120 ms)	10...**30**...120	This parameter specifies the time for software debounce for all the extension inputs. A signal edge at the input is evaluated after a delay according to the time set here.
Telegram rate limit	**disabled** enabled	Here it is possible to configure a general telegram rate limit. If the telegram rate limit is enabled, no more telegrams are transmitted to the bus in 17 seconds (permanently defined, cyclical time interval) than is specified by the parameter "Telegrams per 17 s". This avoids fast edge changes at the inputs causing an inpermissibly high bus load.
Telegrams per 17 s	**30**, 60, 100, 127	Setting the telegram rate (telegrams in 17 s) for the telegram rate limit. Only visible on "Telegram rate limit = enabled".
☐↵ Ex - General (x = 1, 2, 3)		
Function	No function **Switching** Dimming Venetian blind Value transmitter	The basic function of the appropriate extension input is defined here. In the "No function" setting, the extension input is deactivated.

The following parameters are visible for the function "Switching"...

Command on rising edge Switching object 1.1	No reaction **ON** OFF TOGGLE	This parameter can be used to define which object value is transmitted first to the bus via the first communication object of the input when there is a rising edge (TOGGLE - switchover of the object value).
Command on falling edge Switching object 1.1	No reaction ON **OFF** TOGGLE	This parameter can be used to define which object value is transmitted first to the bus via the first communication object of the input when there is a falling edge (TOGGLE - switchover of the object value).
Command on rising edge Switching object 1.2	**No reaction** ON OFF TOGGLE	This parameter can be used to define which object value is transmitted first to the bus via the second communication object of the input when there is a rising edge (TOGGLE - switchover of the object value).
Command on falling edge Switching object 1.2	**No reaction** ON OFF TOGGLE	This parameter can be used to define which object value is transmitted first to the bus via the second communication object of the input when there is a falling edge (TOGGLE - switchover of the object value).
Behaviour after bus voltage return		After a device reset (bus voltage return or ETS programming operation), the communication objects of the input can be initialised. If, in the ETS, a delay is set for the extension inputs after bus voltage return, the device only transmits the telegrams when the delay has elapsed.
	No reaction	After a device reset, no reaction takes place automatically (no telegram is transmitted to the bus).
	Send ON telegram	In this configuration, an "ON" telegram is actively transmitted to the bus after a device reset.
	Send OFF telegram	In this configuration, an "OFF" telegram is actively transmitted to the bus after a device reset.
	Transmit current input status	In this setting, the device evaluates the static signal status of the input and, according to this, transmits the appropriately configured telegram to the bus (contact closed at the input = telegram as with rising edge; contact open at input = telegram as with falling edge). If, in this case, the edge command dependent on the current

		status is configured to "No reaction", the device does not transmit a telegram to the bus on initialisation.

The following parameters are visible for the function "Dimming"...

Operation		This parameter specifies the reaction to a rising edge at the input.
	Single-surface operation: Brighter / darker (TOGGLE)	With a short signal length at the input, the object value of the switching object is toggled and an appropriate telegram transmitted. With a long signal length, a dimming telegram (brighter / darker). The dimming direction is only stored internally and switched on sequential dimming operations.
	Two button operation: Brighter (ON)	With a short signal length at the input, an ON telegram is triggered and, if there is a long signal length, a dimming telegram (brighter) is triggered.
	Two button operation: Darker (OFF)	With a short signal length at the input, an OFF telegram is triggered and, if there is a long signal length, a dimming telegram (darker) is triggered.
	Two button operation: Brighter (TOGGLE)	With a short signal length at the input, the object value of the switching object is toggled and an appropriate telegram transmitted, if there is a long signal length, a dimming telegram (brighter) is triggered.
	Two button operation: Darker (TOGGLE)	With a short signal length at the input, the object value of the switching object is toggled and an appropriate telegram transmitted, if there is a long signal length, a dimming telegram (darker) is triggered.
Time between switching and dimming Seconds (0...59)	**0**...59	Time from which the dimming function ("long signal length") is executed. Sets the time seconds.
Milliseconds (4...9 x 100)	**4**...9	Sets the time milliseconds.
Behaviour after bus voltage return		After a device reset (bus voltage return or ETS programming operation), the communication object "Switching" of the input can be initialised. If, in the ETS, a delay is set for the extension inputs after bus voltage return, the device only transmits the telegrams when the delay has elapsed.
	No reaction	

		After a device reset, no reaction takes place automatically (no telegram is transmitted to the bus).
	Send ON telegram	In this configuration, an "ON" telegram is actively transmitted to the bus after a device reset.
	Send OFF telegram	In this configuration, an "OFF" telegram is actively transmitted to the bus after a device reset.
Increase brightness by	**100 %** 50 % 25 % 12.5 % 6 % 3 % 1.5 %	A dimming telegram can increase brightness by a maximum of X %. This parameter determines the maximum dimming step width for a dimming telegram. This parameter depends on the set operation.
Reduce brightness by	**100 %** 50 % 25 % 12.5 % 6 % 3 % 1.5 %	A dimming telegram can increase darkness by a maximum of X %. This parameter determines the maximum dimming step width for a dimming telegram. This parameter depends on the set operation.
Send stop telegram ?	No **yes**	One or no telegram is transmitted on releasing a pushbutton at the input (falling edge).
Telegram repeat?	**no** yes	It is possible to use this parameter to determine whether the dimming telegram should be repeated cyclically for a long signal length (actuation of a pushbutton at the input).
Time between two telegrams Seconds (0...59)	**0**...59	Time between two telegrams when telegram repetition is active. A new dimming telegram is transmitted after this time has elapsed. Sets the time seconds.
Milliseconds (5...9 x 100)	**5**...9	Sets the time milliseconds.

The following parameters are visible for the function "Venetian Blind"...

Command on rising edge		This parameter specifies the reaction to a rising edge at the input.
	No function	The input is deactivated.

	up	A short time telegram (UP) is triggered by a short signal length and a long time telegram (high) is triggered by a long signal length.
	Down	A short time telegram (DOWN) is triggered by a short signal length and a long time telegram (low) is triggered by a long signal length.
	Toggle	With this setting, the direction is switched over internally long signal length (MOVE). If a short time signal transmits a STEP telegram, then this STEP is always switched in the opposite direction of the last MOVE. Several STEP telegrams transmitted successively are switched in the same direction.
Behaviour after bus voltage return		After a device reset (bus voltage return or ETS programming operation), the communication object "Long time operation" of the input can be initialised. If, in the ETS, a delay is set for the extension inputs after bus voltage return, the device only transmits the telegrams when the delay has elapsed.
	No reaction	After a device reset, no reaction takes place automatically (no telegram is transmitted to the bus).
	up	In this configuration, an "UP" telegram is actively transmitted to the bus after a device reset.
	Down	In this configuration, an "DOWN" telegram is actively transmitted to the bus after a device reset.
Operation concept		This parameter specifies the telegram sequence after actuation (rising edge).
	short – long - short	A STEP is transmitted with a rising edge and the "Time between short and long time operation" started. This step serves to stop a continuous run in progress. If, within the started time, a falling edge is detected, the input does not transmit an additional telegram. If no falling edge was detected during the time, a MOVE is transmitted automatically after the time has elapsed and the "slat adjustment time" is started. If a falling edge is detected within the slat adjustment time, the input transmits a STEP. This function is used for slat adjustment.
	long - short	A MOVE is transmitted when there is a rising edge at the input and the "slat

		adjustment time" started. If a falling edge is detected within the started time, the input transmits a STEP. This function is used for slat adjustment.
Time between step and move operation Seconds (0...59)	**0**...59	Time after which the function of a long actuation is executed. Only visible with "Operation concept = "short – long – short". Sets the time seconds.
Milliseconds (4...9 x 100)	**4**...9	Sets the time milliseconds.
Slat adjusting time Seconds (0...59)	0...**2**...59	Time during which a long time telegram for slat adjustment can be terminated by a falling edge at the input. Sets the time seconds.
Milliseconds (0...9 x 100)	**0**...9	Sets the time milliseconds.

The following parameters are visible for the function "Value transmitter"...

Function as	**Dimming value transmitter** Scene recall without storage function Scene recall with storage function Temperature value transmitter Brightness value transmitter	This parameter specifies the value transmitter function to be executed. The data format of the value object is dependent on the set function of the value transmitter.
Transmit value / light scene number on	**rising edge (pushbutton as NO contact)** falling edge (pushbutton as NC contact) rising and falling edge (switch)	This parameter specifies the edge which starts signal evaluation in the device. The setting "rising and falling edge (switch)" cannot be selected with the value transmitter function "Light scene recall with memory function".
Value on rising edge (0...255)	0...**100**...255	This parameter specifies the value transmitted on a rising edge. Only visible with "Dimming value transmitter" and "Transmit value on = rising edge (pushbutton as NO contact)" and "Transmit value on = rising and falling edge (switch)".

Value on falling edge (0...255)	**0**...255	This parameter specifies the value transmitted on a falling edge. Only visible with "Dimming value transmitter" and "Transmit value on = falling edge (pushbutton as NC contact)" and "Transmit value on = rising and falling edge (switch)".
Light scene number on rising edge (1...64)	**1**...64	This parameter specifies the light scene number transmitted on a rising edge. Only visible with "Light scene recall" and "Transmit value on = rising edge (pushbutton as NO contact)" and "Transmit value on = rising and falling edge (switch)".
Light scene number on falling edge (1...64)	**1**...64	This parameter specifies the light scene number transmitted on a falling edge. Only visible with "Light scene recall" and "Transmit value on = falling edge (pushbutton as NC contact)" and "Transmit value on = rising and falling edge (switch)".
Value on rising edge	0 °C...**20 °C**...40 °C	This parameter specifies the temperature value transmitted on a rising edge. Only visible with "Temperature value transmitter" and "Transmit value on = rising edge (pushbutton as NO contact)" and "Transmit value on = rising and falling edge (switch)".
Value on falling edge	0 °C...**18 °C**...40 °C	This parameter specifies the temperature value transmitted on a falling edge. Only visible with "Temperature value transmitter" and "Transmit value on = falling edge (pushbutton as NC contact)" and "Transmit value on = rising and falling edge (switch)".
Value on rising edge	0 Lux...**200 Lux**...1,500 Lux	This parameter specifies the brightness value transmitted on a rising edge. Only visible with "Brightness value transmitter" and "Transmit value on = rising edge (pushbutton as NO contact)" and "Transmit value on = rising and falling edge (switch)".

Value on falling edge	**0 Lux**...1,500 Lux	This parameter specifies the brightness value transmitted on a falling edge. Only visible with "Brightness value transmitter" and "Transmit value on = falling edge (pushbutton as NC contact)" and "Transmit value on = rising and falling edge (switch)".
Behaviour after bus voltage return		After a device reset (bus voltage return or ETS programming operation), the communication object of the value transmitter or light scene extension can be initialised. If, in the ETS, a delay is set for the extension inputs after bus voltage return, the device only transmits the telegrams when the delay has elapsed.
	No reaction	After a device reset, no reaction takes place automatically (no telegram is transmitted to the bus).
	Reaction as rising edge	In this configuration, a telegram is actively transmitted to the bus after a device reset in accordance with the configuration for the rising edge.
	Reaction as falling edge	In this configuration, a telegram is actively transmitted to the bus after a device reset in accordance with the configuration for the falling edge.
	Transmit current input status	In this setting, the device evaluates the static signal status of the input and, according to this, transmits the appropriately configured telegram to the bus (contact closed at the input = telegram as with rising edge; contact open at input = telegram as with falling edge). This setting can only be configured with "Transmit value on = rising and falling edge (switch)".
Adjustment via long actuation	**no** yes	With the dimming value transmitter and the temperature and brightness value transmitter, the value to be transmitted can be adjusted at any time during device operation. A value adjustment can only be configurable here when the value is to be transmitted only on a rising edge or only on a falling edge, i.e. a pushbutton is connected to the input. A value adjustment is introduced by a long signal at the input (> 5 s) and continues for as long as the signal is detected as active, i.e. the pushbutton is actuated. With the first adjustment after commissioning, the value programmed by the ETS is increased cyclically by the

		step width configured for the dimming value transmitter and transmitted. The step width of the temperature value transmitter (1 °C) and the brightness value transmitter (50 Lux) is permanently defined. The previously transmitted value is saved after releasing the pushbutton. The next long pushbutton actuation adjusts the saved value and the direction of the value adjustment changes. Only visible with "Transmit value on = rising edge (pushbutton as NO contact)" and "Transmit value on = falling edge (pushbutton as NC contact)".
Time between two telegrams Seconds (0...59)	0...**1**...59	The time between two telegrams on adjusting values can be configured here. Only visible on "Adjustment via long actuation = yes"! Sets the time seconds.
Milliseconds (5...9 x 100)	**5**...9	Sets the time milliseconds.
Step width (1...10)	1...**10**	Step width by which the adjusted value is increased or decreased with long actuation. Only visible on "Function as = Dimming value transmitter".

☐↵ Ex - disable (X = 1, 2, 3) - Only for "Switching" function!

Disabling function switching object 1.1	**disabled** enabled	The extension inputs can be separately disabled via the bus using 1-bit objects. With the "Switching" function, it is possible to disable the two switching objects of an input independently of each other. With an active disabling function, signal edges at the input are ignored by the device related to the affected objects. This parameter enables the disabling function of the first communication object.
Polarity of the disabling object	**disable = 1 / enable = 0** disable = 0 / enable = 1	This parameter defines the polarity of the disabling object.
Behaviour at the beginning of the	**No reaction** ON	With an active disable, the first switching object is disabled. This parameter specifies the command transmitted via

disabling function Switching object 1.1	OFF TOGGLE	this object at the beginning of the disabling. "TOGGLE" switches over the current object value.
Behaviour at the end of the disabling function Switching object 1.1	**No reaction** ON OFF Transmit current input status	With an active disable, the first switching object is disabled. This parameter specifies the command transmitted via this object at the end of the disabling. "TOGGLE" switches over the current object value. In the "Transmit current input status" setting, the device evaluates the current static signal status of the input and, according to this, transmits the appropriately configured telegram to the bus (contact closed at the input = telegram as with rising edge; contact open at input = telegram as with falling edge).
Disabling function switching object 1.2	**disabled** enabled	The extension inputs can be separately disabled via the bus using 1-bit objects. With the "Switching" function, it is possible to disable the two switching objects of an input independently of each other. With an active disabling function, signal edges at the input are ignored by the device related to the affected objects. This parameter enables the disabling function of the second communication object.
Polarity of the disabling object	**disable = 1 / enable = 0** disable = 0 / enable = 1	This parameter defines the polarity of the disabling object.
Behaviour at the beginning of the disabling function Switching object 1.2	**No reaction** ON OFF TOGGLE	With an active disable, the second switching object is disabled. This parameter specifies the command transmitted via this object at the beginning of the disabling. "TOGGLE" switches over the current object value.
Behaviour at the end of the disabling function Switching object 1.2	**No reaction** ON OFF Transmit current input status	With an active disable, the second switching object is disabled. This parameter specifies the command transmitted via this object at the end of the disabling. "TOGGLE" switches over the current object value. In the "Transmit current input status" setting, the device evaluates the current static signal status of the input and, according to this,

		transmits the appropriately configured telegram to the bus (contact closed at the input = telegram as with rising edge; contact open at input = telegram as with falling edge).

☐↵ Ex - disable (X = 1, 2, 3) - Only for "Dimming" function!

Disabling function	**disabled** enabled	The extension inputs can be separately disabled via the bus using 1-bit objects. With an active disabling function, signal edges at the input are ignored by the device related to the affected objects. This parameter enables the disabling function of the input.
Polarity of the disabling object	**disable = 1 / enable = 0** disable = 0 / enable = 1	This parameter defines the polarity of the disabling object.
Behaviour at the beginning of the disabling function	**No reaction** ON OFF TOGGLE	With an active disable, the input is disabled. This parameter specifies the command transmitted via the "Switching" object at the beginning of the disabling. "TOGGLE" switches over the current object value.
Behaviour at the end of the disabling function	**No reaction** OFF	With an active disable, the input is disabled. This parameter specifies the command transmitted via the "Switching" object at the end of the disabling.

☐↵ Ex - disable (X = 1, 2, 3) - Only for "Venetian blind" function!

Disabling function	**disabled** enabled	The extension inputs can be separately disabled via the bus using 1-bit objects. With an active disabling function, signal edges at the input are ignored by the device related to the affected objects. This parameter enables the disabling function of the input.
Polarity of the disabling object	**disable = 1 / enable = 0** disable = 0 / enable = 1	This parameter defines the polarity of the disabling object.

Behaviour at the beginning of the disabling function	**No reaction** up Down Toggle	With an active disable, the input is disabled. This parameter specifies the command transmitted via the "Long time operation" object at the beginning of the disabling. "TOGGLE" switches over the current object value.
Behaviour at the end of the disabling function	**No reaction** up Down Toggle	With an active disable, the input is disabled. This parameter specifies the command transmitted via the "Long time operation" object at the end of the disabling. "TOGGLE" switches over the current object value.

□↤ Ex - disable (X = 1, 2, 3) - Only for "Value transmitter" function!

Disabling function	**disabled** enabled	The extension inputs can be separately disabled via the bus using 1-bit objects. With an active disabling function, signal edges at the input are ignored by the device related to the affected objects. This parameter enables the disabling function of the input.
Polarity of the disabling object	**disable = 1 / enable = 0** disable = 0 / enable = 1	This parameter defines the polarity of the disabling object.
Behaviour at the beginning of the disabling function	**No reaction** Reaction as rising edge Reaction as falling edge Transmit current input status	With an active disable, the input is disabled. This parameter specifies the command transmitted via the value object at the beginning of the disabling. In the "Transmit current input status" setting, the device evaluates the static signal status of the input and, according to this, transmits the appropriately configured telegram to the bus (contact closed at the input = telegram as with rising edge; contact open at input = telegram as with falling edge). The selection of the settings of this parameter depends on the configured edge evaluation of the input.
Behaviour at the end of the disabling function	**No reaction** Reaction as rising edge Reaction as falling edge Transmit current input status	With an active disable, the input is disabled. This parameter specifies the command transmitted via the value object at the end of the disabling. In the "Transmit current input status" setting, the device evaluates the static signal status of the input and, according to this, transmits the appropriately

configured telegram to the bus (contact closed at the input = telegram as with rising edge; contact open at input = telegram as with falling edge).
The selection of the settings of this parameter depends on the configured edge evaluation of the input.

☐↤ Ex - disable transmit cyclically (X = 1, 2, 3) - Only for the "Switching" function!

Cyclical transmission ?		Optionally, the object values can be transmitted cyclically to the bus for the "Switching" function. For this, the transmission criteria must first be defined in the ETS. This parameter specifies with which value cyclical transmission should take place. The object value entered in the switching objects by the device on a edge change or externally by the bus is always transmitted cyclically. The object value is then also transmitted cyclically when "no reaction" is assigned to a rising or falling edge. Cyclical transmission also takes place directly after bus voltage return, if the reaction after bus voltage return corresponds to the transmission criterion for cyclical transmission. During an active disable, no cyclical transmissions take place via the disabled input.
	no cyclical transmission	There is no cyclical transmission.
	Repeat on ON	Transmission takes place cyclically when the object value is "ON".
	Repeat on OFF	Transmission takes place cyclically when the object value is "OFF".
	Repeat on ON and OFF	Transmission takes place cyclically irrespective of the object value.
Cyclical transmission Switching object 1.1 ?	**yes** No	Here, it is possible to specify whether cyclical transmission should take place via the first switching object of the input.
Time for cyclical transmission Hours (0...23)	**0**...23	If cyclical transmission should take place via the first switching object of the input, then the cycle time can be configured here. Sets the cycle time hours.
Minutes (0...59)	**0**...59	Sets the cycle time minutes.
Seconds (0...59)	0...**30**...59	Sets the cycle time seconds.
Cyclical transmission Switching object 1.2 ?	yes **no**	Here, it is possible to specify whether cyclical transmission should take place

		via the second switching object of the input.
Time for cyclical transmission Hours (0...23)	**0**...23	If cyclical transmission should take place via the second switching object of the input, then the cycle time can be configured here. Sets the cycle time hours.
Minutes (0...59)	**0**...59	Sets the cycle time minutes.
Seconds (0...59)	0...**30**...59	Sets the cycle time seconds.

4.2.5.3 Energy saving mode parameter

Description	Values	Comment
☐↤ Energy saving mode		
Energy saving mode	**disabled** enabled	The device has an energy saving mode to save electrical energy during operation. If the function is used, the device switches to the energy saving mode after a preset time without operation or switches to a separate object controlled by an external telegram (see "Activating energy saving mode"). In the energy saving mode, essential operation and signalling functions of the device are switched off. The acoustic signal transmitter and extension inputs are then without any functions. This parameter enables the energy saving mode so that it can be used.
Activating energy saving mode	by object **automatically by time** automatically by time or by object	The device has two different activation options for setting the rotary sensor to the energy saving mode. These can either be combined together or used separately. Firstly, the rotary sensor can be set to the energy saving mode by a group telegram using a communication object designated for this purpose. Secondly, it is possible to change automatically to the energy saving mode if an operation no longer occurs within a defined time period (including the extension).
Deactivating energy saving mode	by object **automatically on operation** automatically by time or on operation	The device also has two different options for deactivation of the energy saving mode, which can either be combined together or used separately. Firstly, the energy saving mode can be deactivated by a group telegram via the communication object designated for this purpose. Secondly, it is possible to deactivate the energy saving mode automatically as soon as the rotary knob or push-button are operated. If an operation of the push-button or rotary knob deactivates the energy saving mode, the device always executes the configured operating function immediately as well (e.g. switching, dimming...).
Polarity object "energy saving mode"	**"0" = --- /** **"1" = mode active** "0" = mode active /	This parameter defines the telegram polarity for the object for activating or deactivating the energy saving mode. The options and thus standard setting of

	"1" = --- **"0" = mode inactive / "1" = mode active** "0" = mode active / "1" = mode inactive **"0" = mode inactive / "1" = ---** "0" = --- / "1" = mode inactive	this parameter depend on whether the energy saving mode can only be activated, only deactivated or activated as well as deactivated via the object.
Time for energy saving mode Minutes (1...59)	**1**...59	This parameter defines the time that must elapse after an operation so that the device activates the energy saving mode. Each operation or status change of the signals at the extension inputs restarts the time. Setting the delay time minutes. This parameter is only visible when the energy saving mode is to be activated automatically by time.
Seconds (0...59)	**0**...59	Setting the delay time seconds. This parameter is only visible when the energy saving mode is to be activated automatically by time.

5 Appendix

5.1 Index

Feller AG | Postfach | 8810 Horgen | 0844 72 73 74 | customercare.feller@feller.ch | www.feller.ch
Feller SA | Caudray 6 | 1020 Renens | 0844 72 73 74 | customercare.feller@feller.ch | www.feller.ch

Feller
by Schneider Electric