Product documentation

KNX push-button standard

Art. no. ..107.1ST

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Table of Contents

1 Information on the product

1.1 Product catalogue

Product name	Article number	Use	Design
KNX push-button standard 1-gang	..10711ST	Sensor	FM (Flush-mounted)
KNX push-button standard 2-gang	..10721ST	Sensor	FM (Flush-mounted)

1.2 Function

General

The device is KNX Data Secure capable. KNX Data Secure offers protection against manipulation in building automation and can be configured in the ETS project. Detailed specialist knowledge is required. A device certificate, which is attached to the device, is required for safe commissioning. During mounting, it is recommended to remove the certificate from the device and to store it securely.

The device can be updated. Firmware updates can be carried out conveniently using the Jung ETS service App (additional software).

Push-button sensor functions

When its buttons are actuated, the device sends telegrams to the KNX, depending on the ETS parameter settings. These can be telegrams for switching, for dimming or for controlling blinds. 1 Byte value transmitter functions can also be programmed.

The operation concept can be configured in the ETS either as a rocker function or alternatively as a button function (only "Switching" function). With the rocker function, two buttons lying one above the other are combined into one rocker. In the button function, each button is evaluated as single-area operation.

LED function

The device possesses a one colour status LED per rocker. These status LEDs can either be switched on or off permanently, or can function as a button-press display for a button or rocker. As an alternative, the LEDs can also be activated via separate communication objects. The status LEDs can indicate the switching status of an object statically or by flashing.

If no application or a wrong application is loaded into the device, the status LED flashes. In this case the device is discharged and has no function.

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 controlled by an external telegram to a separate object.

1.3 Device components

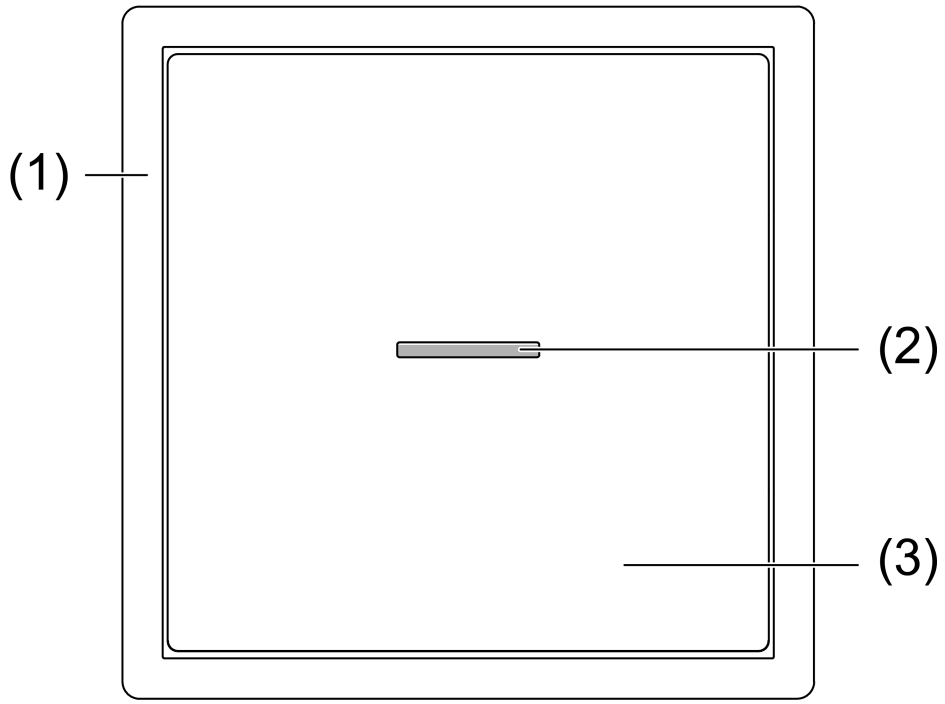

Image 1: Device components 1-channel

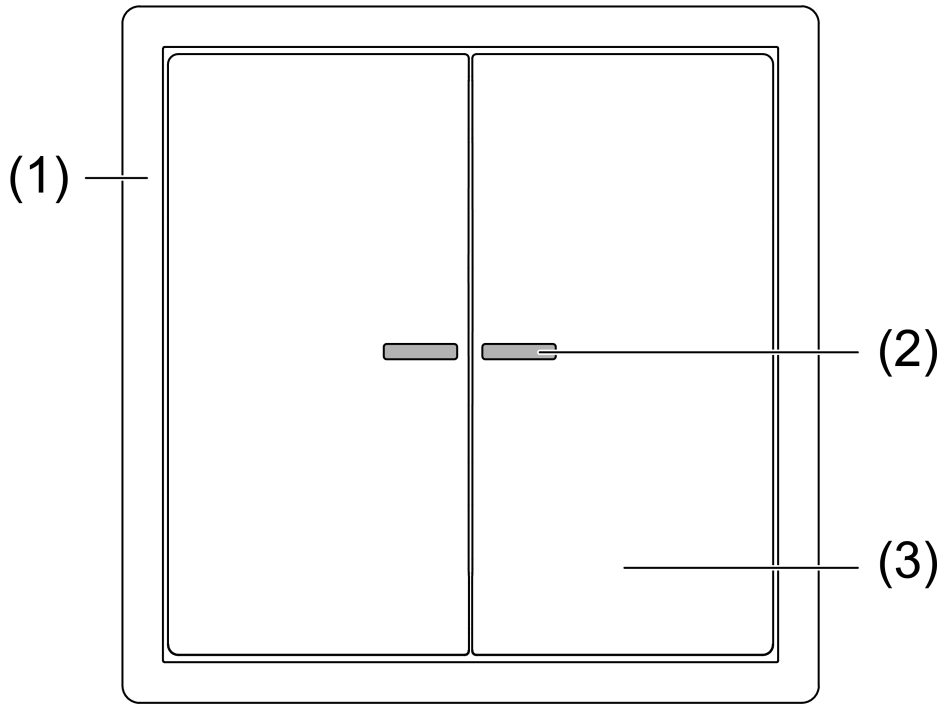

Image 2: Device components 2-channel

(1) Design frame (accessories)
(2) Status LED
(3) Operating rockers (accessory)

1.4 Delivery state

In the delivery state, the device is discharged. When the bus voltage is connected, the status LEDs signal this status by flashing.

The status LED belonging to the button is switched on when the button is pressed and switched off again when the button is released. If no further operation takes place within 10 seconds, the corresponding status LED switches back to the signalling for the discharged state (flashing).

In the delivery state, the device does not send any telegrams to the bus.

1.5 Technical data

KNX

KNX medium	TP256
Safety	X-mode
Commissioning mode	S-mode
Rated voltage	DC 21 ... 32 V SELV
Current consumption KNX	4.9 ... 8.2 mA
Connection mode KNX	Standard device connection terminal
Connecting cable KNX	EIB-Y (St)Y 2x2x0.8
Protection class	III

Ambient conditions

Ambient temperature	-5 ... +45 °C
Storage/transport temperature	-25 ... +70 °C

1.6 Accessories

Rocker for KNX push-button 1-gang	Art. no. ..101..
Rocker for KNX push-button 2-gang	Art. no. ..102..

2 Safety instructions

Electrical devices may only be mounted and connected by electrically skilled persons.

Serious injuries, fire or property damage possible. Please read and follow manual fully.

These instructions are an integral part of the product, and must remain with the end customer.

3 Fitting and electrical connection

DANGER!

Mortal danger of electric shock.

- Cover up live parts in the installation environment.

Mounting and connecting the device (see figure 3)

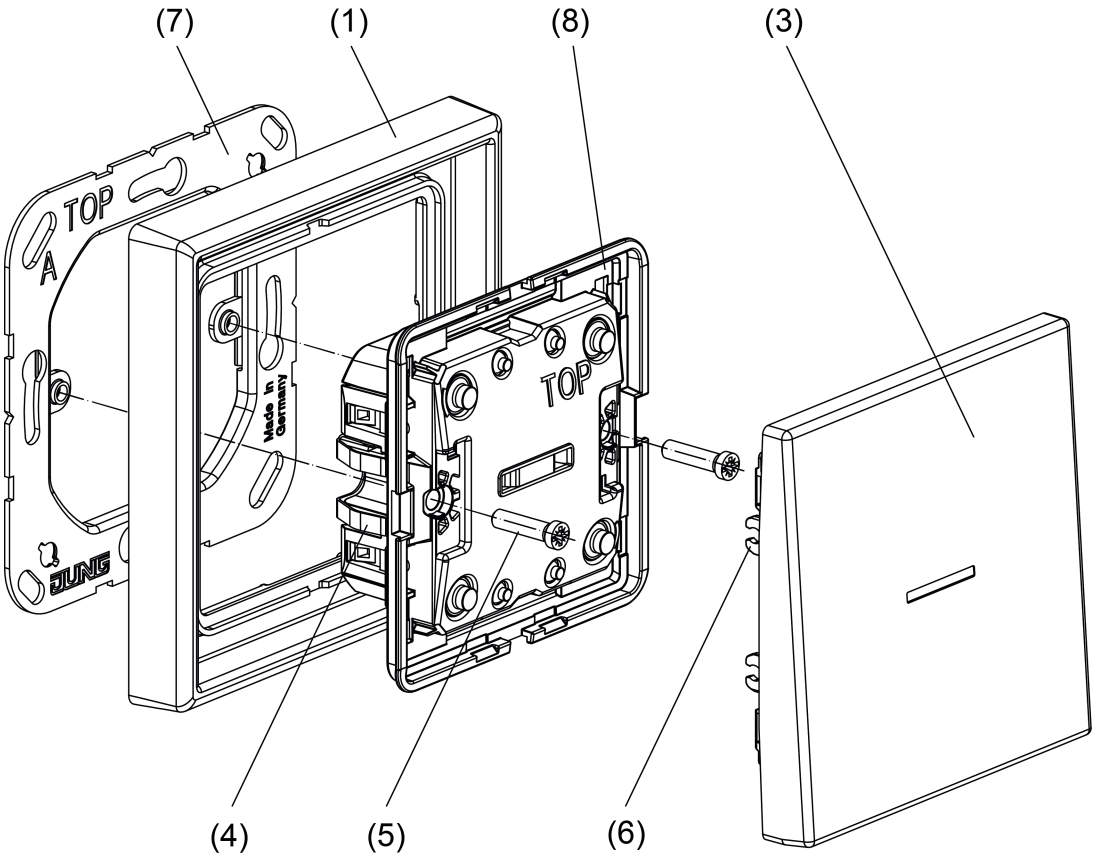

Image 3: Fitting the device

(1) Design frame
(3) Operating rocker (top = narrow side)
(4) Retaining spring
(5) Screw
(6) Retaining clamp
(7) Supporting frame
(8) Device module

DANGER!

Danger of electric shock

When mounting with 230 V socket outlets under a common cover, there is a danger of electrical shocks in the event of a fault.

- Use only the enclosed plastic screws for fastening to the supporting frame!

In secure operation (preconditions):

– Secure commissioning is activated in the ETS.

– Device certificate entered/scanned or added to the ETS project. A high resolution camera should be used to scan the QR code.

– Document all passwords and keep them safe.

- Mount supporting frame in the right orientation on an appliance box.

i Note marking TOP and marking A (= in front).

i Use the supplied box screws.

- Connect device to the KNX using KNX connecting terminal (red= +, black = -).
- In secure operation: It is advisable to remove the secure certificate from the device.
- Attach device onto the supporting frame.
- Optional: Screw the device to the supporting frame. Tighten the plastic screws only lightly.
- Snap on rockers.

i The rockers suitable for the device must be ordered separately (see accessories).

i The device should be used in an air-tight appliance box. Drafts cause incorrect temperature values to be measured.

Dismantling the operating rockers (see figure 4)

The operating rockers can be dismantled using a dismantling wedge or a screwdriver (see figure 5).

i The recesses are intended for a blade width of up to 4 mm.

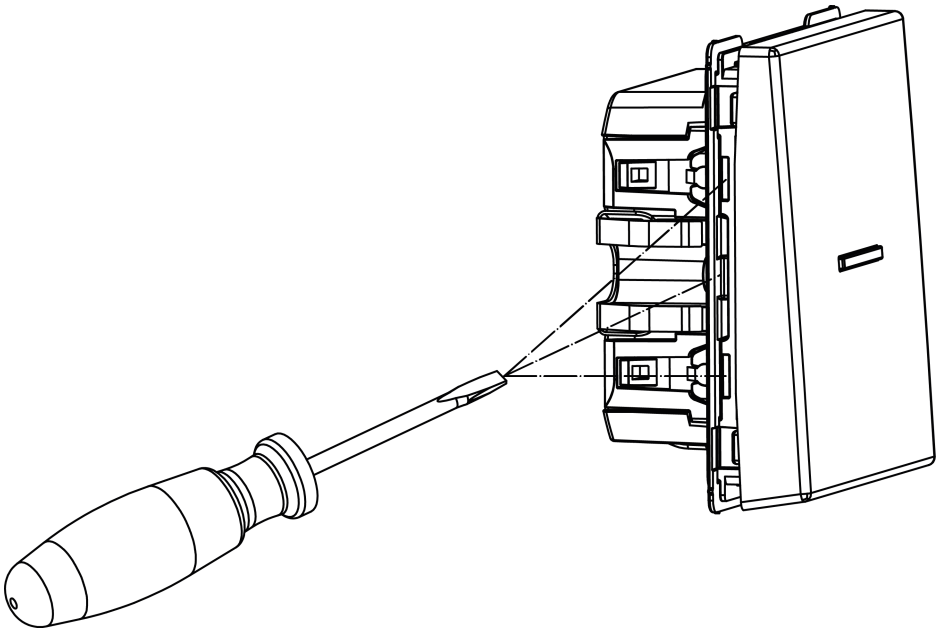

Image 4: Dismantling rocker from the side

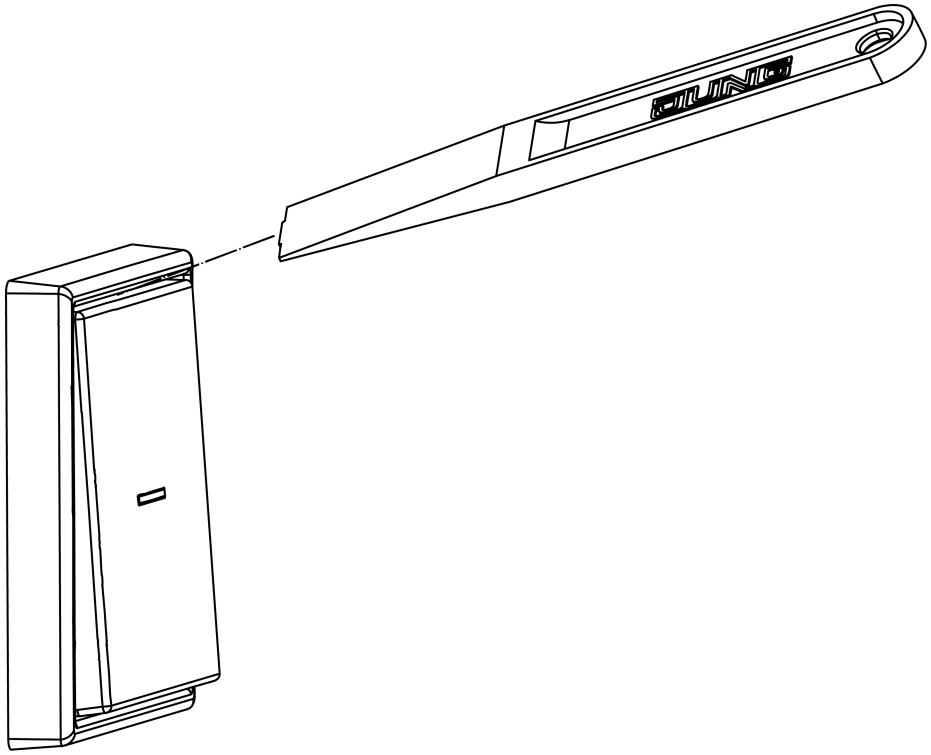

Image 5: Dismantling rocker from above

4 Commissioning

After connection and mounting, the device can be commissioned. The commissioning is basically confined to programming with the ETS and attaching the decorative operating areas.

Preconditions in secure operation

- A dedicated application program is required.
- Secure commissioning is activated in the ETS.
- Device certificate entered/scanned or added to the ETS project. A high resolution camera should be used to scan the QR code.
- Document all passwords and keep them safe.

Programming the physical address

The device does not have a separate programming button or LED. Programming mode is activated by a defined and time-delayed press of the push-buttons at the upper left (9) and lower right (10). The active programming mode is signaled on the base module by the rapid flashing (approx. 8 Hz) of the status LED. To program the physical address, the decorative control surfaces can be snapped onto the device.

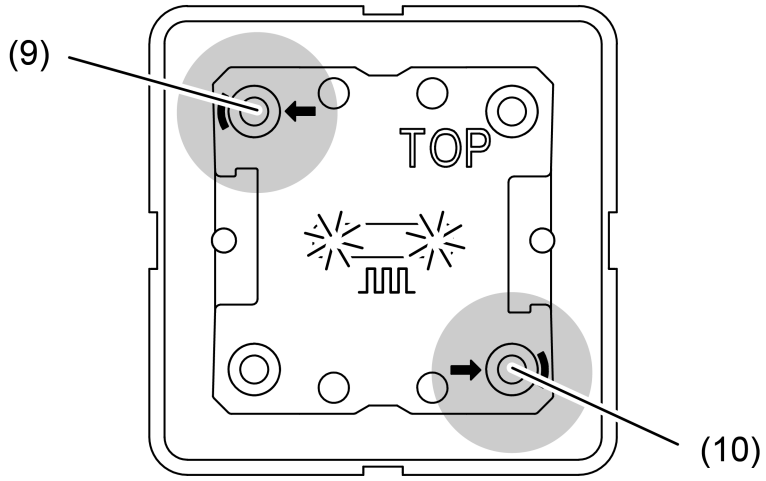

Image 6: Buttons for activating Programming mode

If the device contains no – or an incorrect – application program, both status LEDs flash slowly (approx. 0.75 Hz).

Activation of the programming mode without attached rockers.

Precondition: The device is connected and ready for operation.

- Activate programming mode: Press and hold push-button at the upper left (9). Then press push-button at the lower right (10) (see figure 6).

  The status LEDs flash rapidly (approx. 8 Hz). Programming mode is activated.

Use suitable objects to push the buttons (e.g. thin screwdriver, tip of a ballpoint pen, etc.)

To exclude any inadvertent activation of Programming mode during 'normal' use of the control surface in later operation, the time between the first and the second actuation must be at least 200 ms. Pressing simultaneously (time between first and second actuation < 200 ms) will not result in an activation of Programming mode!

- Load the physical address into the device.

  The status LEDs return to their previous state – off, on, or flashing. Physical address is programmed.

- Write the physical address on the device label.
- Programming mode ends:
  - Automatically after adoption of the physical address
  - By pressing any button on the basic module

If Programming mode is to be activated or deactivated in a device which is already programmed with a valid application, there is the possibility that telegrams will be transmitted to the bus at the time the button is pressed. The telegram transmitted depends on the button function programmed.

Programming the application program

Afterwards, the application program has to be programmed into the device using the ETS. Project design and commissioning with ETS from version5.7.3and above.

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.

4.1 Safe-state mode

The safe state mode stops the execution of the loaded application program. A master reset can be performed if the device is not functioning correctly, for example by:

– faulty project design or
– faulty commissioning

i Only the system software of the device is still functional. ETS diagnosis functions and programming of the device are possible.

Activating the safe-state mode

- Switch off the bus voltage.
- Press and hold down the top left and bottom right button.
- Switch on the bus voltage.

  The safe-state mode is activated. The status LEDs flash slowly (approx. 1 Hz).

i Only release the the top left and bottom right buttons when the LEDs flash.

Deactivating safe-state mode

- Switch off bus voltage or carry out ETS programming.

4.2 Master reset

The master reset deletes the loaded application program from the device. A master reset can be performed if the device is not functioning correctly, for example by:

– faulty project design or
– faulty commissioning

The master reset restores the basic device setting (physical address 15.15.255, firmware remains in place). The device must then be recommissioned with the ETS.

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

Performing a master reset

Precondition: The safe-state mode is activated.

- Press and hold down the top left and bottom right button for > 5 seconds.

  The device performs a master reset. The status LEDs flash rapidly (approx. 4 Hz).

  The device restarts. The status LEDs flash slowly (approx. 0.75 Hz).

Only release the the top left and bottom right buttons when the LEDs flash.

4.3 Restoring the device to factory settings

Devices can be reset to factory settings with the ETS Service App. This function uses the firmware contained in the device that was active at the time of delivery (delivery state). Restoring the factory settings causes the devices to lose their physical address and configuration.

4.4 Flashing sequence of the status LEDs

Status LED status	Flash frequency
Application discharged / stopped	approx. 0.75 Hz
Safe-state mode	approx. 1 Hz
Status display flashes	approx. 2 Hz
Alarm signal	approx. 2 Hz
Master reset	approx. 4 Hz
Programming mode	approx. 8 Hz
Full-surface operation	approx. 8 Hz

5 Operation

Operating areas

The device consists of up to 2 operating areas, depending on the device variant. The operating concept of an operating area can be configured in the ETS as a rocker function or as a button function.

With the rocker function, an operating area is divided into two buttons (top/bottom) with the same basic function.

In the button function either an operating area is divided into 2 functionally separate buttons (double-area operation), or an operating area is evaluated as single-area operation (only one button).

Centrally on each operating area, there is a status LED, which can be connected to the control function, according to the function of the rocker or buttons. A status LED can also signal completely independent display information, flash or be permanently on or off. Besides functions that can be set using the ETS, the status LED also indicates that the device is in the programming mode for commissioning or diagnosis purposes.

6 Application programs

ETS search paths:	Push-button/ push-button, 1-gang/ Push-button standard 1-gang
	Push-button/ push-button, 2-gang/ Push-button standard 2-gang
Configuration:	S-mode standard

Application program available for Push-button standard 1-gang

Name	Push-button standard 1-gang 115311
Version:	1.1 for ETS version 5.7.3 onwards
from mask version	07B0
Summarized description	Standard push-button sensor application. 1 rockers or 2 push-buttons on the basic device Energy saving mode can be activated.

Application program available for Push-button standard 2-gang

Name	Push-button standard 2-gang 115411
Version:	1.1 for ETS version 5.7.3 onwards
from mask version	07B0
Summarized description	Standard push-button sensor application. 2 rockers or 4 push-buttons on the basic device Energy saving mode can be activated.

7 Scope of functions

General

- KNX Data Secure capable
- Firmware updates are possible

Push-button sensor functions

- Operating concept can be configured (rocker function or as a button)
- Button evaluation for button function concept can be configured (single-area or double-area operation)
- Button function can be configured (switching, no function)
- Rocker function can be configured (switching, dimming, Venetian blind, value transmitter, scene extension)

  Switching: The command on pressing and/or releasing is adjustable (no reaction, switch on, switch off, toggle).

  Dimming: The command on pressing and the time between switching and dimming is adjustable.

  Venetian blind: The command on pressing is adjustable. The operating concept can be adjusted in the times for short and long actuation and slat adjustment.

  Value transmitter: The operating mode (1-byte (0...255) or 1-byte (0...100%) value transmitter) and the value is adjustable. The value adjustment can optionally be activated by long button-press

  Scene extension: The operating mode (with or without storage function) and the scene number is adjustable.

Status LED

- Function can be configured

  The function is selected per status LED.

  When selecting the function for each status LED, the following functions can be configured: Always OFF, Always ON, Button-press display and Activation via separate LED object
- The status LED can light up in red.
- Energy saving mode can be activated

  If the energy-saving mode is activated, all LEDs are switched off. The following settings are possible: activate energy saving mode, deactivate energy saving mode, polarity of the object.

8 Channel-oriented device functions

The following subchapters provide a description of the device functions. Each subchapter consists of the following sections:

- Functional description
- Table of parameters
- Object list

Functional description

The functional description explains the function and provides helpful tips on project design and usage of the function. Cross references support you in your search for further information.

Table of parameters

The table of parameters lists all parameters associated with the function. Each parameter is documented in a table as follows.

Name of the parameter	Parameter values
Parameter description	

Object list

The object list specifies and describes all communication objects associated with the function. Each communication object is documented in a table.

Object no.	This column contains the object number of the communication object.
Function	This column contains the function of the communication object.
Name	This column contains the name of the communication object.
Type	This column contains the length of the communication object.
DPT	This column assigns a datapoint type to a communication object. Datapoint types are standardized in order to ensure interoperability of KNX devices.
Flag	This column assigns the communication flags in accordance with the KNX specification.
K flag	activates / deactivates the communication of the communication object
L flag	enables externally triggered reading of the value from the communication object
S flag	enables externally triggered writing of the value to the communication object
Ü flag	enables transfer of a value
A flag	enables updating of an object value in case of feedback
I flag	enforces updating of the communication object value when the devices is switched on (reading at init)

8.1 Rockers and button functions

The various functions that can be configured in the ETS for each rocker or button on the device are described below. The functions can be parameterised for the basic device as well as for the push-button extension.

8.1.1 Switching

For each rocker or button with the function set to "switching", the ETS indicates two 1-bit communication objects. The parameters permit fixing the value the "switching" object is to assume on pressing and/or releasing (ON, OFF, TOGGLE – toggling of the object value). No distinction is made between a brief or long press.

8.1.1.1 Table of parameters

The following parameters are available for the individual buttons, depending on the set operating concept. The default settings change in accordance with the set operating concept.

Command on pressing	no reaction ON OFF **TOGGLE**
This parameter defines the reaction when the button is pressed.	

Command on releasing	**no reaction** ON OFF TOGGLE
This parameter defines the reaction when the button is released.	

8.1.1.2 Object list

The following communication objects are available for the individual rockers or buttons, depending on the set operating concept. The name of the object corresponds to the selection of the operating concept and can be adjusted by the parameter "Name of ..." .

Object no.	Function	Name	Type	DPT	Flag
37, 40, ..., 46	Switching	Button/rocker *n* - output	1-bit	1,001	C, -,W, T, -
1-bit object for transmission of switching telegrams (ON, OFF).					

Object no.	Function	Name	Type	DPT	Flag
38, 41, ..., 47	Switching feedback	Button/rocker *n* - input	1-bit	1,001	C, -,W, -, U
1-bit object for receiving feedback telegrams (ON, OFF).					

8.1.2 Dimming

For each rocker with the function set to "dimming", the ETS indicates two 1-bit 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 parameterisation the device transmits a telegram for stopping the dimming action after a long press. The time needed by the device to detect an actuation as a long actuation can be set in the parameters.

The "Dimming" function distinguishes between double-area operation (UP, DOWN) and single-area operation (TOGGLE). The parameter "Command on pressing" defines the single-surface or double-surface dimming function.

dual-area operation	single-area operation
Brighter (ON)	Brighter / darker (TOGGLE)
Darker (OFF)	Brighter (TOGGLE)
	Darker (TOGGLE)

With double-area operation, the device transmits a telegram for switching on or off after a brief press, and a telegram for increasing the brightness ("Brighter") or decreasing the brightness ("Darker") after a long press.

With single-area operation, the device transmits ON and OFF telegrams in an alternating pattern ("TOGGLE") for each brief press, and the "brighter" and "darker" telegrams in an alternating pattern for long actuations.

i The device always transmits the dimming commands with a dimming step width of 100 %. A stop telegram is transmitted at the end of the dimming operation (releasing the button).

Feedback

If an actuator is controlled from multiple control elements, the actuator must report its switching status to the 1-bit object "Switching feedback" of the button or rocker. Due to the feedback, the device detects that the actuator has changed its switching status by input from another element and adjusts the dimming direction accordingly.

The dimming direction is always only evaluated and switched locally, unless the actuator changes its switching status due to input from multiple elements (e.g. lighting ON / change of brightness value only). The 4-bit dimming objects are not synchronized via the bus.

8.1.2.1 Table of parameters

The following parameters are available for the individual buttons, only visible in the operating concept "rocker function".

Command on pressing	**Brighter (ON)** Darker (OFF) Brighter / darker (TOGGLE) Brighter (TOGGLE) Darker (TOGGLE)
This parameter defines the reaction when a button is pressed. If the device is to toggle on a brief press, the corresponding switching objects of other sensors with the same function must be interlinked.	

Time between switching and dimming	**0** ... 59 s | 100 ... **400** ... 990 ms
This parameter defines how long the button must be pressed for a dimming telegram to be transmitted.	

8.1.2.2 Object list

The following communication objects are available for the individual rockers. The name of the object corresponds to the selection of the operating concept and can be adjusted by the parameter "Name of ..." .

Object no.	Function	Name	Type	DPT	Flag
73, 81	Switching	Rocker *n* - Output	1-bit	1,001	C, -,W, T, -
1-bit object for transmission of switching telegrams (ON, OFF).					

Object no.	Function	Name	Type	DPT	Flag
74, 82	Dimming	Rocker *n* - Output	4-bit	3,007	C, -, -, T, -
4-bit object for the transmission of relative dimming telegrams.					

Object no.	Function	Name	Type	DPT	Flag
75, 83	Switching feedback	Rocker *n* - Input	1-bit	1,001	C, -,W, -, U
1-bit object for receiving feedback telegrams (ON, OFF).					

8.1.3 Venetian blind

For each rocker with the function set to "Venetian blind" the ETS indicates the two 1-bit objects "STEP operation" and "MOVE operation".

The "Venetian blind" function distinguishes between double-area operation (UP, DOWN) and single-area operation (TOGGLE). The "Command on pressing" parameter defines the single-area or double-area blind function.

dual-area operation	single-area operation
UP	TOGGLE
DOWN	

The double-surface Venetian blind function is preset in the parameters. This means that the device e.g. with a press of the top button, transmits a telegram for an upward movement and, after a press of the bottom button, transmits a telegram for a downward movement.

Feedback

If the actuator can be controlled from several sensors, a faultless single-area operation requires that the long time objects of the control elements are interlinked. The 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.

Operation concept for the Venetian blind function

For the control of Venetian blind, roller shutter, awning or similar drives, the device supports the operating concept "Long - short or short".

Operation concept "long – short or short":
In this operation concept, the device shows the following behaviour:

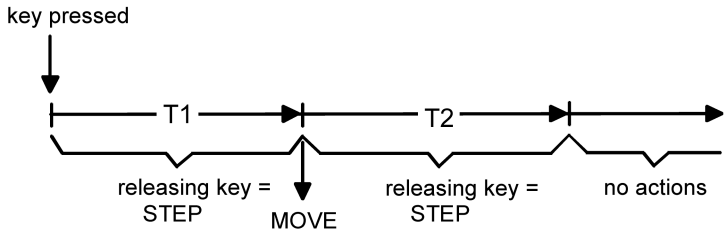

Image 7: Operation concept "long – short or short"

– 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 travelling time of the drive, a pushbutton 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.

In this operation concept, the device will not transmit a telegram immediately after depressing one side of the rocker. This principle permits detecting a full-surface operation when the sensor is configured as a rocker.

8.1.3.1 Table of parameters

The following parameters are available for the individual buttons, only visible in the operating concept "rocker function".

Command on pressing	**UP** DOWN TOGGLE
This parameter defines the running direction of the drive on pressing the button. If the setting is "TOGGLE", the direction is changed after each long time command. If several devices are to control the same drive, the long time objects of the devices must be interlinked to ensure that the running direction can be changed correctly.	

Operation concept	**long – short or short**
The Operation concept "long – short or short" will be used for Venetian blind control.	

Time between short-time and long-time command	**0** ... 4 min | **0** ... 59 s | 100 ... **400** ... 990 ms
This parameter sets the time after which the long-time operation will be evaluated on pressing the button.	

Slat adjusting time	**0** ... 4 min | **0** ... 59 s | 100 ... **500** ... 990 ms
The time during which a transmitted MOVE telegram can be terminated by releasing the button (STEP) is set here. This function serves to adjust the slats of a blind.	

8.1.3.2 Object list

The following communication objects are available for the individual rockers. The name of the object corresponds to the selection of the operating concept and can be adjusted by the parameter "Name of ..." .

Object no.	Function	Name	Type	DPT	Flag
113, 119	Short time operation	Rocker *n* - Output	1-bit	1,007	C, -, -, T, -
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.					

Object no.	Function	Name	Type	DPT	Flag
114, 120	Long-time operation	Rocker *n* - Output	1-bit	1,008	C, -,W, T, -
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.					

8.1.4 Value transmitter

For each rocker switch, whose function is set to "value transmitter", the ETS indicates one object. On pressing a button, the configured value is transmitted to the bus. Different values can be configured for both buttons of the rocker.

Value ranges

The "Function" parameter determines the value range used by the value transmitter.

Function	Function	Lower numerical limit	Upper numerical limit
1-byte value transmitter	0...255	0	255
1-byte value transmitter	0...100%	0%	100%

For each of these ranges, the value that can be transmitted to the bus for each button actuation is configurable.

Value adjustment by long button-press

If the value adjustment feature is activated in the ETS, the button for adjusting the value must be kept depressed longer than the configured time period after pressing the button until the start of the adjustment 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.

Upon activating the "value adjustment by long button-press" parameters, further parameters are displayed in the ETS for configuring the value adjustment.

Example 1: Value adjustment without overflow
- Function = value transmitter 1 byte (0...255)
- Value (0...255) = 227
- Step width = 5
- Starting value on value adjustment = same as configured value
- Direction of value adjustment = toggling (alternating)
- Time between two telegrams = 0.5 s

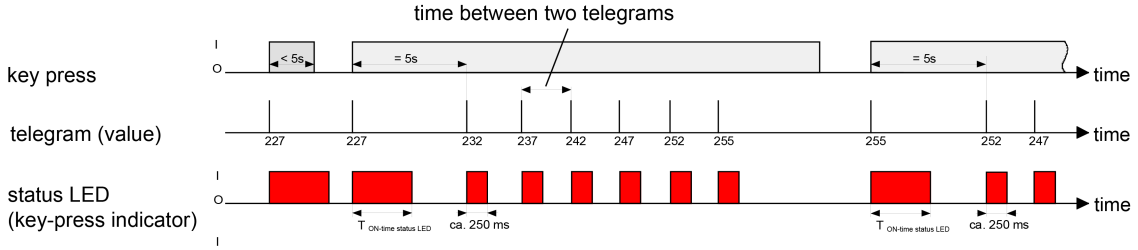

Image 8: Example of value adjustment without value range overflow

Example 2: Value adjustment with overflow
- Function = value transmitter 1 byte (0...255)
- Value (0...255) = 227
- Step width = 5
- Starting value on value adjustment = same as configured value
- Direction of value adjustment = toggling (alternating)
- Time between two telegrams = 0.5 s

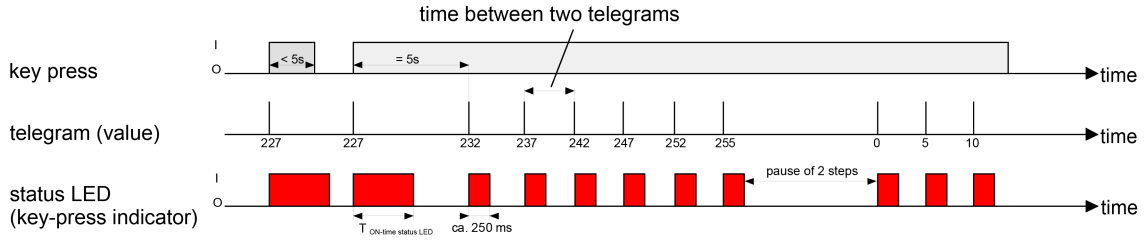

Image 9: Example of value adjustment with value range overflow

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

During a value adjustment, a status LED parameterised for the "actuation display" function flashes for each newly sent value if this key is assigned to the status LED for value adjustment.

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.

8.1.4.1 Table of parameters

The following parameters are available for the individual buttons, only visible in the operating concept "rocker function".

Function	**1 byte (0...255)** 1 byte (0...100%)
The "value transmitter" function differentiates between 1-byte values. The following parameters and their settings depend on the setting for this parameter.	

Value (0…255)	**0**...255
This parameter defines the object value when the button is pressed. Visible only if "Function = 1 byte (0...255)".	

Value (0…100 %)	**0**...100
This parameter defines the object value when the button is pressed. Visible only if "Function = 1 byte (0...100%)".	

Value adjustment by long button-press	Active **Inactive**
If the value adjustment is activated by a long button-press, the ETS shows further parameters. If a status LED is configured for the "actuation display" function and is assigned to the button for value adjustment, then this flashes during a value adjustment. The status LED symbolises that a new telegram has been transmitted.	

Starting value in case of value adjustment	Same as configured value Same as value after last adjustment **Same as value from communication object**
Value adjustment can begin with different starting values. With "Same as parameterised value": After each long press, the device always starts with the value configured in the ETS. With "Same as value after last adjustment": 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. With "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 = Active"! The start value of the value adjustment is different for both buttons of a rocker if the setting is "same as value after last adjustment". If the value adjustment works for both buttons of a rocker and the last rocker adjustment is to be taken into account, the setting "same as value from communication object" must be configured.	

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 = Active"!	

Step width	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 or if it exceeds the upper limit, the sensor adapts the step width of the last step automatically. This parameter is only visible if "Value adjustment by long button-press = Active"!	

Time period after pressing button until the start of value adjustment	0.5 s 1 s 2 s 3 s **5 s**
This parameter determines the time from when the device starts the value adjustment after a key is pressed. This parameter is only visible if "Value adjustment by long button-press = Active"!	

Time between two telegrams	**0.5 s** 1 s 2 s 3 s
This parameter defines the interval at which the device transmits new telegrams during a value adjustment. This parameter is only visible if "Value adjustment by long button-press = Active"!	

Value adjustment with overflow	Active **Inactive**
If value adjustment is to be effected without overflow (setting "inactive") and if the device reaches the lower limit of the adjustment range or the upper limit during value adjustment, the adjustment will be stopped automatically by the sensor. If the value adjustment with overflow is programmed (setting "active") 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.	

8.1.4.2 Object list

The following communication objects are available for the individual rockers. The name of the object corresponds to the selection of the operating concept and can be adjusted by the parameter "Name of ..." .

Object no.	Function	Name	Type	DPT	Flag
143, 157	Value transmitter 0...255	Rocker *n* - Output	1 bytes	5,010	C, -,W, T, -
1-byte object for the transmission of values from 0 to 255. These objects are only visible if function: 1-byte (0...255).					

Object no.	Function	Name	Type	DPT	Flag
143, 157	Value transmitter 0…100 %	Rocker *n* - Output	1 bytes	5,001	C, -,W, T, -
1-byte object for transmitting values from 0 to 100%. These objects are only visible if function: 1-byte (0...100%).					

8.1.5 Scene extension

For each rocker with the function set to "scene extension unit", the ETS indicates the "Function" parameter which distinguishes 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 the "scene extension" 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.

Function for the setting "… Scene extension without storage function":

- A button actuation results in a simple recall of the scene.
- A long button-press has no further or additional effect.

Function for the setting "… Scene extension with storage function":

- A button actuation of less than one second results in a simple recall of the scene.
- A button-press of more than five seconds, generates a storage instruction. In the scene extension function, a storage telegram is in this case transmitted to the bus. The internal scene is stored. The internal scene control module will then request the current scene values for the actuator groups used from the bus.

A button actuation lasting between one and five seconds will be discarded as invalid.

8.1.5.1 Table of parameters

The following parameters are available for the individual buttons, only visible in the operating concept "rocker function".

Function	**Scene extension without storage function** Scene extension with storage function
This parameter defines the functionality of the scene extension. If the device is used as a scene extension, the scenes can either be stored in one or several other KNX 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 button.	

Scene number (1 … 64)	**1**...64
In accordance with the KNX standard, objects with data type 18.001 "Scene Control" can retrieve or store up to 64 scenes by their numbers. The parameter defines the scene number to be transmitted when the button is pressed.	

8.1.5.2 Object list

The following communication objects are available for the individual rockers. The name of the object corresponds to the selection of the operating concept and can be adjusted by the parameter "Name of ..." .

Object no.	Function	Name	Type	DPT	Flag
214, 220	Scene extension	Rocker *n* - Output	1 bytes	18,001	C, -, -, T, -
1-byte object for recalling or for storing one of 64 scenes max. from a scene push button sensor.					

8.2 Status LED

Each operating area of the basic device has a status LED.

The 1-gang device variant has one status LED (see figure 1) and the 2-gang device variant has 2 status LEDs (see figure 2).

The configurable functions of the status LED adapt to the configured functions of the rockers or buttons.

A status LED can either be assigned to a rocker or two buttons.

The KNX push-button standard are equipped with one status LED per rocker.

Device variant	Status LED
KNX push-button standard 1-gang	A one-colour status LED (R)
KNX push-button standard 2-gang	Two one-colour status LEDs (R)

Independent functions of the status LED

A variety of functions of the status LED can be configured independently of the configured rocker or button function. These functions either define a fixed lighting status of the status LED or have a separate communication object.

The following functions can always be configured for each Status LED:

- always OFF
- always ON
- Control via separate LED object

Dependent functions of the status LED

A function of the status LED can be configured depending on the configured rocker or button function.

The following function is configurable for each Status LED depending on the configured rocker or button function.

- Button-press display

8.2.1 Basic functions

"always OFF" or "always ON"

The corresponding status LED is always switched off or always switched on depending on the parameter setting.

"button-press display"

This function can be configured for each status LED if the function is configured to "switching", "dimming", "Venetian blind", "value transmitter", "scene extension" or "controller extension":

- With the rocker function, each actuation of one of the two buttons is displayed.
- With the key function, the parameter "Assignment of the status LED" decides whether the actuation of both keys or a single key is displayed.

A status LED used as button-press display is switched on by the device each time the corresponding rocker or button is pressed. The parameter "Light period of status LED for button-press indicator" on the parameter page "General -> Status LED" determines how long the status LED for all status LEDs remains on together. Even if the device only sends a telegram when you release it, the status LED lights up regardless of whether you press the rocker or button.

i In the "value transmitter" device function with activated value adjustment by a long button-press, a status LED configured for the "Actuation display" function flashes each time a new value is transmitted.

"control via separate LED object"

Each status LED indicates 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, or also activated as flashing. If multiple status LEDs are configured to "flashing" and switched on, they will flash synchronously.
It is possible to indicate or evaluate the inverted object value.

i After a bus reset or after ETS programming, the value of the LED object is always "OFF".

8.2.2 Table of parameters

The following parameters are configured on the "General" -> Status-LED" parameter page.

Function and colour	**user-defined (function selection per status-LED)**
At this point, the display concept of the status LED is displayed. In the specified setting "User-defined", the usual LED functions are available, e.g. button-press display. The settings are selected separately for each status LED on the corresponding parameter page.	

Colour	**red**
The colour of the status LED is selected at this point.	

Light duration of status LED for button-press display	1 s 2 s **3 s** 4 s 5 s
This parameter defines the switch-on time the status LED is lit up to indicate actuation. The setting concerns all status LEDs whose function is set to "Button-press display".	

The following parameters are configured on the parameter pages "Status-LED *n* - function".

Function of status LED	always OFF always ON **Button-press display** Control via separate LED object
The ETS automatically compiles the selection of functions of the status LED depending on the set rocker or button function. Only functions that make sense in combination with the parameterised rocker or button function are offered for selection.	

The following selection of LED basic functions can be configured for each rocker or button function.

Function of status LED	always OFF always ON Control via separate LED object
always OFF: Irrespective of the pushbutton or rocker function, the status LED is switched off permanently. always ON: Irrespective of the pushbutton or rocker function, the status LED is switched on permanently. Control via separate LED object: The status LED indicates the state of its own, separate 1-bit LED object. This setting causes the additional parameter "Control of the status LED via object value" to be shown.	

The following selection of status LED functions can be configured **in addition** to the basic functions for the functions "switching", "dimming", "Venetian blind", "value transmitter", "scene extension" and "controller extension".

Function of status LED	Button-press display
button press display: The status LED indicates a button actuation. The ON time is set on the parameter page "General" in common for all status LEDs that are configured as actuation displays.	

The following parameter is visible on the parameter pages "Status-LED *n* - function" if the function of the status LED is configured to "control via separate LED object".

Control of the status LED via object value	**1 = LED static ON / 0 = LED static OFF** 1 = LED static OFF / 0 = LED static ON 1 = LED flashes / 0 = LED static OFF 1 = LED static OFF / 0 = LED flashes
This parameter defines the telegram polarity of the 1-bit object "status LED". The LED can be switched on or off statically. In addition, the received switching telegram can be evaluated in such a way that the LED flashes.	

8.2.3 Object list

The following communication objects are available for the individual buttons or rockers, depending on the set operating concept. The name of the object corresponds to the selection of the operating concept and can be adjusted by the parameter "Name of ..." .

Object no.	Function	Name	Type	DPT	Flag
449, 473	Switching	Status LED *n* - Input	1-bit	1,001	C, -, W, -, -
1-bit object for activation of the status LED.					

9 Channel-independent device functions

The following subchapters provide a description of the device functions. Each subchapter consists of the following sections:

- Functional description
- Table of parameters
- Object list

Functional description

The functional description explains the function and provides helpful tips on project design and usage of the function. Cross references support you in your search for further information.

Table of parameters

The table of parameters lists all parameters associated with the function. Each parameter is documented in a table as follows.

Name of the parameter	Parameter values
Parameter description	

Object list

The object list specifies and describes all communication objects associated with the function. Each communication object is documented in a table.

Object no.	This column contains the object number of the communication object.
Function	This column contains the function of the communication object.
Name	This column contains the name of the communication object.
Type	This column contains the length of the communication object.
DPT	This column assigns a datapoint type to a communication object. Datapoint types are standardized in order to ensure interoperability of KNX devices.
Flag	This column assigns the communication flags in accordance with the KNX specification.
K flag	activates / deactivates the communication of the communication object
L flag	enables externally triggered reading of the value from the communication object
S flag	enables externally triggered writing of the value to the communication object
Ü flag	enables transfer of a value
A flag	enables updating of an object value in case of feedback
I flag	enforces updating of the communication object value when the devices is switched on (reading at init)

9.1 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 controlled by an external telegram to a separate object. In the energy saving mode, essential display functions of the device are switched off. The status LED is then without any function. The energy saving mode can be deactivated by actuating a button or by a special telegram. Afterwards, the device is fully functional again.

The energy saving mode can only be parameterised in the ETS if no alarm message is parameterised!

Activating energy saving mode

The device has two different activation options for setting the device to the energy saving mode. These can either be combined together or used separately.

Firstly, the device can be set to the energy saving mode by a group telegram via 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 switch to the energy saving mode automatically if no button has been actuated on the device within a defined time period. The time for this case is defined in the ETS. Each operation restarts the time for activating the energy saving mode.

On activation of energy-saving mode, all status LEDs are switched off under forced control.

Any activation attempts of the energy saving mode are ignored while the programming mode of the device is active.

Deactivating energy saving mode

The device has two different options for deactivation of energy-saving mode, which can be optionally combined.

Firstly, it is always possible to deactivate energy-saving mode automatically, as soon as the device is operated.

On the other hand, deactivation can also take place 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.

If an operation deactivates the energy saving mode, the device always executes the configured operating function immediately as well (e.g. switching, dimming, etc ...).

If the transmission flag is set, then other devices can be informed of the deactivation of energy-saving mode by actuating a button on the local device, causing them also to leave energy-saving mode (precondition: all the devices are linked to the same group address and the deactivation via an object must be

possible in the parameterisation of the other devices). When energy-saving mode is deactivated when the transmission flag is set, the device sends an "Energy-saving mode deactivated" telegram to the bus, according to the inverted activated telegram polarity.

The device will activate the energy saving mode even if the control surfaces are disabled. The energy saving mode (first operation) can also be deactivated by a disabled button. The configured operating functions (switching, dimming...) will not be executed thereby, however.

9.1.1 Table of parameters

"General" parameter page

Energy saving mode	Active **Inactive**
The energy saving mode can be enabled here. If the alarm signalling is enabled, the energy saving mode cannot be enabled.	

The following parameters are visible on the "Energy saving mode" parameter page if the energy saving mode has been activated.

Activating energy saving mode	**by object** automatically by time automatically by time or by object
This parameter defines how the energy saving mode is activated in the device. Firstly, the device can be set to the energy saving mode by a group telegram via a communication object designated for this purpose. Secondly, it is possible to switch to the energy saving mode automatically if no button has been actuated within a defined time period.	

Deactivating energy saving mode	**automatically on operation** automatically on operation or via object
This parameter defines how the energy saving mode is deactivated in the device. Firstly, it is possible to deactivate energy-saving mode automatically, as soon as the device is operated. If an operation of the device deactivates the energy saving mode, the device always executes the configured operating function immediately as well (e.g. switching, dimming, etc.). Secondly, the energy saving mode can be deactivated by a group telegram via a communication object designated for this purpose. However, this possibility can only be combined with the automatic deactivation on operation.	

Polarity of the "Energy saving mode" object	**0 = activate / 1 = deactivate** 1 = activate / 0 = deactivate
This parameter defines the telegram polarity for the object for activating or deactivating the energy saving mode.	

Time to activate energy saving mode	**1**...60 min
This parameter defines the time that must elapse after an operation so that the device activates the energy saving mode. Each operation restarts the time.	

9.1.2 Object list

Object no.	Function	Name	Type	DPT	Flag
35	Activate / deactivate	Energy saving mode - input	1-bit	1,003	C, -,W, -, U
1-bit object for activating or deactivating the energy saving mode. If the transmission flag is set, then other devices can be informed of the deactivation of energy-saving mode through operation on the local device, causing them also to leave energy-saving mode (precondition: all the devices are linked to the same group address and the deactivation via an object must be possible in the parameterisation of the other devices). When energy-saving mode is deactivated when the transmission flag is set, the device sends an "Energy-saving mode deactivated" telegram to the bus, according to the inverted activated telegram polarity.					

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