

KNX manual
2/4-way wireless push button RF
KNX
PD 1 RF KNX



PD 1 RF KNX 4941675

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1 ⚡ IMPORTANT WARNINGS!



Danger of death through electric shock or fire!

- Installation should only be carried out by a qualified electrician!
- Before installation/dismounting, disconnect the mains voltage!
- Protect against accidental contact during installation.

2 Features

General:

- 2/4-way wireless push button with dimming actuator
- For installation in flush-mounted boxes
- Programming mode can be activated via button combination

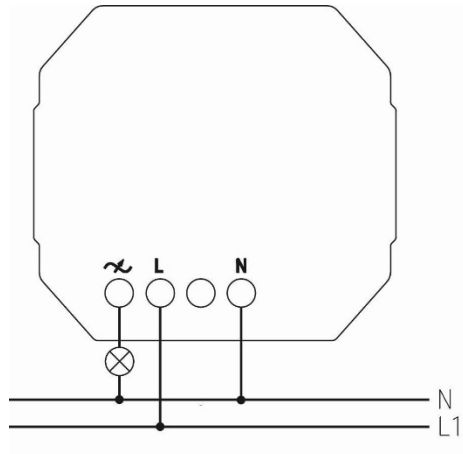
Wireless push button:

- Can be used as a 2- or 4-way push button
- Optionally for direct control of the dimming actuator as well as dimming and blinds control with one and two-button operation possible
- Free allocation of functions: switching, dimming, blinds, priority, value, percentage value

Dimming actuator:

- Also suitable for controlling fans
- Automatic load detection (can be deactivated)
- For R, L and C-loads
- Participation in central commands such as permanent on, permanent off, central switching and save/call up scene.

2.1 Wiring diagram



3 Operation

The wireless push button with dimming actuator PD 1 RF KNX has four buttons (F1-F4) and a 1-channel dimming actuator.

i In the factory setting, the dimming actuator can be controlled directly with all 4 buttons without configuration.

Depending on the setting of the F1 button in the ETS, the actuator can be operated in 2 different ways:

Control via bus telegrams.

This is the classic configuration for a KNX actuator.

The actuator is controlled exclusively via bus telegrams.

i In this case, the buttons F1-F4 have no internal connection to the actuator.

Direct control (setting in the ETS)

The actuator channel can be operated with the F1 button.

i The F1 button is then used exclusively for this function and is no longer connected to the bus in this configuration, i.e. there are no communication objects.

The actuator itself retains all of its communication objects in this configuration

Either a single or double rocker can be fitted.

Depending on the rocker selection, the application must be configured accordingly:

- Single rocker = 2-way push button
- Double rocker = 4-way push button

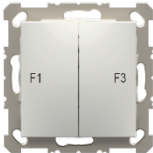
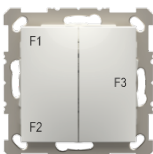
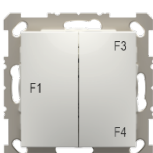
3.1 Button assignment for 2-way push button

When using a 2-way push button, either a single push button (F1/F2) or rocker (F1) can be configured.

Type of operation	Button assignment
Single push button (F1/F2)	
Rocker (F1)	

3.2 Button assignment for 4-way push button

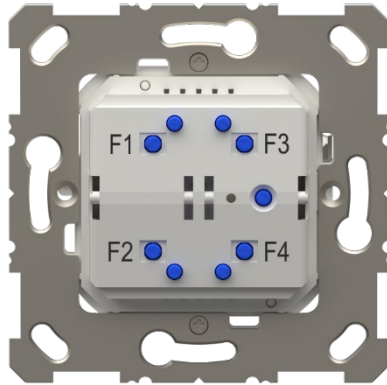
When using a 4-way push button, a distinction is made between left (F1/F2) and right (F3/F4). There is also a choice between single push button and rocker. This provides 4 configuration options.

Type of operation left	Type of operation right	Button assignment
Single push button (F1/F2)	Single push button (F3/F4)	
Rocker (F1)	Rocker (F3)	
Single push button (F1/F2)	Rocker (F3)	
Rocker (F1)	Single push button (F3/F4)	

3.3 Activating programming mode

Programming mode is activated by pressing any function button (F1-F4) six times, regardless of the application's charge status.

After successful activation, this is indicated by a red LED on the front of the device and also by a status LED on the back of the device.



Programming mode will be ended immediately by pressing any function button. After 4 minutes of inactivity, programming mode will automatically be terminated.

i The 6x click must occur within 3 seconds

i The physical address LED on the device front is only visible when the rocker switch is removed

3.4 Factory settings / Master reset

To reset the device to the factory settings using a master reset, the following button combination must be used:

- Device must be in programming mode (6x click of any function button)
- Press any button for 10 -15 s
- Release the button briefly (< 1 s)
- Press the same button for 10 - 15 s
- The successful master reset is signalled by the physical address LED flashing quickly 3 times after the button is released

i The FDSK remains valid, the physical address is set to 15.15.255

i Direct switching of the actuator is again possible via all 4 buttons

4 Technical data

Operating voltage	230 – 240 V AC
Frequency	50 – 60 Hz
Standby output	< 0.4 W
type of contact	ε contact
Load types	R/L/C
minimum load	2 W
Protection rating	IP 20
Protection class	II subject to designated installation
Operating temperature	-5 °C – +45 °C
With trailing edge	bulb/halogen lamp load/dimmable LEDs 250 W at 25 °C
With leading edge	LED 22 W (up to 25 °C)
Rated impulse voltage	4 kV
Pollution degree	2
Max. cable cross-section	Solid: 0.5 mm ² (Ø 0.8 mm) to 4 mm ² Stranded wire with crimp terminal: 0.5 mm ² to 2.5 mm ²
Torque screw terminal	0.5 Nm
Type of installation	Flush-mounted installation
Installation depth	25.6 mm
Max. cable length	100 m
Radio standard	KNX RF1.R
Radio frequency	868.3 MHz
Transmission power	< 10 mW
Free field range	Up to 100 m
Coding	FSK (Frequency Shift Keying)
Transceiver type	bidirectional

load type	Nominal voltage	Ambient temperature	leading edge (L mode) trailing edge (RC mode)	Possible max. Load
Incandescent lamps	230 V / 50 Hz	45°C	RC mode	200 W
Halogen lamps Transformer (inductive)	230 V / 50 Hz	25°C	L mode	200 VA
	230 V / 50 Hz	45°C	L mode	130 VA
LED - lamp load	230 V / 50 Hz	25°C	RC mode	250 W
		45°C		200 W
		25°C	L mode	24 W ¹
		45°C		12 W ¹
Electronic transformer	230 V / 50 Hz	25°C	RC mode	250 W

4.1 Important information



The power supply (at the fuse box) must be switched off without fail when replacing lamps.



The connection of dimmers in **series** or in **parallel** is not permitted.



Do not install adjustable transformers ahead of the dimmer.



Ripple control pulses from electric power plants may cause temporary flickering of the lighting.



When connecting a larger number of LED lamps in parallel, the function might be impaired even with loads < 250W. The reason for this are the accumulating inrush currents, which may vary widely, depending on the type of lamp.

¹ The output with LED lamps in the leading edge is largely depending on the lamp type. Therefore, the dimmer might dim down because of an excess temperature. In this case, select the trailing edge operating mode! The device will not be damaged by this.

5 General information about KNX Secure

From ETS5 version 5.5 (ETS version 5.7.7 or higher is recommended for the PD 1 RF KNXKNX), secure communication in KNX systems is supported. A distinction is made between secure communication via the IP medium using KNX IP Secure and secure communication via the TP and RF media using KNX Data Secure. The following information refers to KNX Data Secure.

In the ETS catalogue, KNX products supporting “KNX Secure” are clearly marked. 

As soon as a “KNX-Secure” device is included in the project, the ETS requests a project password. If no password is entered, the device is included with Secure Mode deactivated. However, the password can also be entered or changed later in the project overview.

5.1 Start-up with "KNX Data Secure"

For secure communication, the FDSK (Factory Device Setup Key) is required. If a KNX product supporting "KNX Data Secure" is included in a line, the ETS requires the input of the FDSK. This device-specific key is printed on the device label and can either be entered by keyboard or read by using a code scanner or notebook camera.

Example of FDSK on device label:



After entering the FDSK, the ETS generates a device-specific tool key. The ETS sends the tool key to the device to be configured via the bus. The transmission is encrypted and authenticated with the original and previously entered FDSK key. Neither the tool key nor the FDSK key are sent in plain text via the bus.

After the previous action, the device only accepts the tool key for further communication with the ETS.

The FDSK key is no longer used for further communication, unless the device is reset to the factory setting: In this case, all set safety-related data will be deleted.

The ETS generates as many runtime keys as needed for the group communication you want to protect. The ETS sends the runtime keys to the device to be configured via the bus.

Transmission takes place by encrypting and authenticating them via the tool key. The runtime keys are never sent in plain text via the bus.

The FDSK is saved in the project and can be viewed in the project overview.

All keys for this project can also be exported (backup).

During project planning, it can be defined subsequently which functions/objects are to communicate securely. All objects with encrypted communication are identified by the "Secure" icon in the ETS.



5.2 Start-up without "KNX Data Secure"

Alternatively, the device can also be put into operation without KNX Data Secure. In this case, the device is unsecured and behaves like any other KNX device without KNX Data Secure function.

To start up the device without KNX Data Secure, select the device in the 'Topology' or 'Devices' section and set the 'Secure start-up' option in the 'Properties' area of the 'Settings' tab to 'Deactivated'.

6 The "PD 1 RF KNX" application program

6.1 Selection in the product database

Manufacturer	Theben AG
Product family	Push button
Product type	PD 1 RF KNX
Program names	PD 1 RF KNX

Number of communication objects	44
Number of group addresses	255
Number of associations	255

 The ETS database can be found on our website: www.theben.de/downloads

 Recommended ETS version: ETS 5.7.7 or higher.

6.2 Overview of communication objects

6.2.1 dimming actuator

No.	Object name	Function	Length	R	W	C	T	DPT
1	C1 – Dim – Receive	Switching On/Off	1 bit	-	W	C	-	1.001
2	C1 – Dim – Receive	Brighter/darker	4 bit	-	W	C	-	3.007
3	C1 – Dim – Receive	dimming value	1 byte	-	W	C	-	5.001
4	C1 – Dim – Receive	Soft switching	1 bit	-	W	C	-	1.001
5	C1 – Dim – Receive	Block	1 bit	-	W	C	-	1.001
6	C1 – Dim – Receive	Call up/save scenes	1 byte	-	W	C	-	18.001
7	C1 – Dim – Receive	Enable scenes = 1	1 bit	-	W	C	-	1.001
		Block scenes = 1	1 bit	-	W	C	-	1.001
8	C1 – Dim – Receive	Force	2 bit	-	W	C	-	2.001
		Dimming value with force	1 byte	-	W	C	-	5.001
		Force = 1	1 bit	-	W	C	-	1.001
		Force = 0	1 bit	-	W	C	-	1.001
9	C1 – Dim – Receive	Dimming value limitation	1 byte	-	W	C	-	5.001
10	C1 – Dim – Send	Feedback On/Off	1 bit	R	-	C	T	1.001
11	C1 – Dim – Send	Feedback in %	1 byte	R	-	C	T	5.001
12	C1 – Dim – Send	Operating hours feedback	4 bytes	R	-	C	T	13.100
		Time to next service	4 bytes	R	-	C	T	13.100
13	C1 – Dim – Send	Service required	1 bit	R	-	C	T	1.001
14	C1 – Dim – Receive	Reset service	1 bit	-	W	C	-	1.001
		Reset operating hours	1 bit	-	W	C	-	1.001
15	C1 – Dim – Send	General error notification	1 bit	R	-	C	T	1.001
16	C1 – Dim – Send	Short circuit message	1 bit	R	-	C	T	1.001
17	C1 – Dim – Send	Excess temperature message	1 bit	R	-	C	T	1.001
18	C1 – Dim – Send	Mains power failure	1 bit	R	-	C	T	1.001
19	C1 – Dim – Send	Load type message	1 byte	R	-	C	T	20.610

6.2.2 Wireless push button: Switching function, priority, percentage value, value

No.	Object name	Function	Length	R	W	C	T	DPT
41	<i>F1.1 – Send/receive</i>	<i>Switching</i>	1 bit	R	W	C	T	1.001
		<i>Priority</i>	2 bit	R	-	C	T	2.001
		<i>Percentage value</i>	1 byte	R	-	C	T	5.001
		<i>Value</i>	1 byte	R	-	C	T	5.010
42	<i>F1.2 – Send/receive</i>	<i>Switching</i>	1 bit	R	W	C	T	1.001
		<i>Priority</i>	2 bit	R	-	C	T	2.001
		<i>Percentage value</i>	1 byte	R	-	C	T	5.001
		<i>Value</i>	1 byte	R	-	C	T	5.010
45	<i>F1 - Receive</i>	<i>Block = 1</i>	1 bit	-	W	C	-	1.001
		<i>Block = 0</i>	1 bit	-	W	C	-	1.003
51-75	Channels 2 to 4 (details: see channel 1)							

6.2.3 Wireless push button: Dimming function

No.	Object name	Function	Length	R	W	C	T	DPT
41	<i>F1 – Send/receive</i>	<i>Switching</i>	1 bit	R	W	C	T	1.001
42	<i>F1 - Send</i>	<i>Brighter/darker</i>	4 bit	R	-	C	T	3.007
		<i>Brighter</i>	4 bit	R	-	C	T	3.007
		<i>Darker</i>	4 bit	R	-	C	T	3.007
43	<i>F1.1 – Send/receive</i>	<i>Switching</i>	1 bit	R	W	C	T	1.001
		<i>Priority</i>	2 bit	R	-	C	T	2.001
		<i>Percentage value</i>	1 byte	R	-	C	T	5.001
		<i>Value</i>	1 byte	R	-	C	T	5.010
45	<i>F1 - Receive</i>	<i>Block = 1</i>	1 bit	-	W	C	-	1.001
		<i>Block = 0</i>	1 bit	-	W	C	-	1.003
51-75	Channels 2 to 4 (details: see channel 1)							

6.2.4 Radio push button: Blinds function

No.	Object name	Function	Length	R	W	C	T	DPT
41	<i>F1 - Send</i>	<i>Step/stop</i>	1 bit	R	-	C	T	1.010
42	<i>F1 - Send/receive</i>	<i>Up/down</i>	1 bit	R	W	C	T	1.008
		<i>Up</i>	1 bit	R	W	C	T	1.008
		<i>Down</i>	1 bit	R	W	C	T	1.008
43	<i>F1.1 - Send/receive</i>	<i>Switching</i>	1 bit	R	W	C	T	1.001
		<i>Priority</i>	2 bit	R	-	C	T	2.001
		<i>Send percentage value</i>	1 byte	R	-	C	T	5.001
		<i>Height % ²</i>	1 byte	R	-	C	T	5.001
		<i>Send value</i>	1 byte	R	-	C	T	5.010
44	<i>F1.2 - Send</i>	<i>Slat %²</i>	1 byte	R	-	C	T	5.001
45	<i>F1 - Receive</i>	<i>Block = 1</i>	1 bit	-	W	C	-	1.001
		<i>Block = 0</i>	1 bit	-	W	C	-	1.003
51-75	Channels 2 to 4 (details: see channel 1)							

6.2.4 General objects

No.	Object name	Function	Length	R	W	C	T	DPT
101	<i>Central permanent - Receive</i>	<i>On</i>	1 bit	-	W	C	-	1.001
102	<i>Central permanent - Receive</i>	<i>Off</i>	1 bit	-	W	C	-	1.001
103	<i>Central switching - receive</i>	<i>On/Off</i>	1 bit	-	W	C	-	1.001
104	<i>Central scenes - receive</i>	<i>Call up/save</i>	1 byte	-	W	C	-	18.001

² Upon double-click with object type = *Height % + slat %*

6.3 Description of communication objects

6.3.1 Objects for the dimming actuator

Object 1: Switching On/Off

1 = Switch on load

0 = Switch off load

See also: Parameter Switch-on value.

Object 2: Brighter/Darker

This object is actuated with a 4-bit telegram (DPT 3.007 Control_Dimming). This function can be used to incrementally dim the light up or down. In the standard application, telegrams are sent with 64 increments.

IMPORTANT: The response to 4-bit telegrams depends on the parameters *Switching On and Off with a 4-bit dimming telegram*. See appendix: 4-bit telegrams (brighter/darker)

Object 3: Dimming value

This object can be used to select the desired dimmer setting directly.

Format: 1 byte percentage value (0..100%)

Object 4: Soft switching

A 1 on this object starts a soft switching cycle, i.e.: The brightness is gradually increased, starting from the minimum brightness. The dimming value remains constant for the programmed time and is then gradually reduced after this time has elapsed.

Once the programmed minimum brightness has been reached, the dimming value is reset to 0%.

The cycle can be extended or prematurely terminated via further telegrams

This sequence can also be controlled using a time switch if the *Time between Soft ON and Soft OFF* parameter is set to *Until Soft OFF telegram*. The dimming cycle is then started with a 1 and finished with a 0.

See appendix: Soft switching

Object 5: Block

Responses to the block being set and cancelled can be configured if the block function has been activated (C1 (Dimming) configuration options parameter page).

The block only applies when the object is received, i.e. with 0 the channel is not blocked after restoration of the bus supply.

If the parameter *Behaviour when setting the block* = *No change*, a running soft-switch process will not be interrupted.

Object 6: Call up/save scenes

Only available if the scene function has been activated (C1 (Dimming) configuration options parameter page).

This object can be used to save and subsequently call up scenes.

Saving stores the dimming value of the channel. It does not matter how this dimming value is produced (whether via switch commands, central objects or the buttons on the device). The saved dimming value is restored when it is called up. All scene numbers from 1 to 63 are supported. The channel can participate in up to 8 scenes.

See appendix: Scenes

Object 7: Enable scenes = 1, block scenes = 1

Blocks the scene function with a 1 or a 0 depending on the configuration.
As long as it is blocked, scenes cannot be saved or called up.

Object 8: Force, dimming value during force, force = 1, force = 0

The function of the force object can be configured as a 1, 2-bit or 1-byte object.

Format of the forced object	Force		Response with force	
	trigger with	end with	Begin	End
1 bit	1 or 0 (configurable)	0 or 1 (configurable)	configurable in the application program	
2 bit	Force On = 3 Force Off = 2	Deactivate force = 0 or 1	Force On: configurable in the application program Force Off: Off	configurable in the application program
1 byte	1-100%	0%	The triggering telegram acts simultaneously as a force dimming value	configurable in the application program

Object 9: Dimming value limitation

The value received will be accepted as the maximum configurable dimming value.
Its range of applicability is defined on the Dimming value limits parameter page.

Object 10: Feedback On/Off

Sends the current dimming status:
1 = current dimming value is between 1% and 100%
0 = current dimming value is 0%

Object 11: Feedback in %

Sends the new dimming value after a change as soon as a dimming process is completed, i.e. once the new set point value has been reached.
Format: 1 byte, 0 ... 255 i.e. 0 ... 100%

Object 12: Operating hours feedback, time to next service

Only available if the hour counter function is activated (Configuration options parameter page).
Reports, depending on selected type of hour counter (Hour counter and service parameter page), either the remaining period to the next set service or the current status of the hour counter.

Object 13: Service required

Only available if the hour counter function is activated (Configuration options parameter page) and *Type of hour counter = Counter for time to next service*.

Reports if the next service is due.
0 = not due
1 = service is due.

Object 14: Reset service, reset operating hours

Only available if the hour counter function is activated
(Configuration options parameter page).

Object 15: General error notification

Used as a malfunction signal:

0 = no error

1 = an error has been detected

This message can, for example, be shown on a display

Object 16: Short circuit message

0 = OK

1 = short circuit at dimmer output:

Check connected lines and load.

Object 17: Excess temperature message

0 = OK

1 = the dimmer is overloaded³:

- connected power is too high
- ambient temperature is too high
- incorrect installation position, i.e. device cannot dissipate the heat

Object 18: Mains power failure

0 = OK

1 = no mains voltage available:

Mains failure or defective hardware.

Object 19: Load type message

Feedback of detected load type in DPT20.610 format.

0 = undefined

1 = leading edge (L load connected), conventional transformers

2 = trailing edge (C-load connected), electronic transformers or incandescent lamp load
This control is also used for resistive loads (R-loads).

3 = no load detection possible, or error.

³ The dimmer is deactivated in the event of excess temperature, dimming value = 0%

6.3.2 Objects for the radio push button

6.3.2.1 Switching function, priority, send percentage value, send value

Object 41: F1.1 - send/receive switching, priority, percentage value...

First output object of the channel (first telegram).

Telegram format: Send/receive switching, send priority, send percentage value, send value.

Object 42: F1.2 - send/receive switching, priority, percentage value...

Second output object of the channel (second telegram, optional).

Telegram format: Send/receive switching, send priority, send percentage value, send value.

Objects 43-44

Not used.

Object 45: F1 - receive block = 1, or block = 0

The channel is blocked via this object.

The direction of action of the block object can be configured.

Objects 51-75

Objects for channels 2-4

6.3.2.2 Dimming function

Object 41: F1 - send/receive switching

Switches the dimming actuator on and off.

Object 42: F1 - send brighter, darker, brighter/darker

Sends 4-bit dimming commands to the dimming actuator.

Object 43: F1.1 - send/receive switching, priority, percentage value...

Output object for the additional function on double-click.

4 telegram formats can be set:

- Send/receive switching
- Send priority
- Send percentage value
- Send value 0-255

Object 45: F1 - receive block = 1, or block = 0

The channel is blocked via this object.

The direction of action of the block object can be configured.

Objects 51-75

Objects for channels 2-4

6.3.2.3 Blinds function

Object 41: F1 - send step/stop

Sends step/stop commands to the blinds actuator.

Object 42: F1 - send/receive up, down, up/down

Sends operating commands to the blinds actuator.

Object 43: F1.1 - send/receive switching, hight % + slat %, priority...

Output object for the additional function on double-click.

5 telegram formats can be set:

- Send/receive switching
- Send priority, send percentage value
- Send value 0-255
- Send height %.

Object 44: F1.2 - send slat %

Slat telegram for positioning the blinds upon double-click (together with object 43, with *object type = height + slat*).

Object 45: F1 - receive block = 1, or block = 0

The channel is blocked via this object.

The direction of action of the block object can be configured.

Objects 51-75

Objects for channels 2-4

6.3.3 General objects

Object 101: Central permanent On

Central switch-on function.

0 = no function

1 = permanent ON

 This object takes top priority. As long as it is set, other switch commands will not work on the participating channel.

Object 102: Central permanent Off

Central switch-off function.

0 = no function

1 = permanent OFF

 This object has the second highest priority after Central permanent On. As long as it is set, other switch commands will not work on the participating channel.

Object 103: Central switching

Central switch function.

0 = Off

1 = On

With this object, the channel responds exactly as if its input object were receiving a switch command.

Object 104: Call up/save central scenes

Central object for using scenes.

This object can be used to save and subsequently call up "scenes".

See appendix: [Scenes](#)

6.4 Parameter pages overview

6.4.1 Wireless push button:

Parameter page	Description
<i>General</i>	Basic settings such as 2-way or 4-way push button and single push button or rocker, direction of action of the block telegram
<i>F1..F4 button [position]⁴</i>	Description, function of the input, number of telegrams.
<i>F1 Control directly⁵</i>	Fixed single button operation
<i>F1..F4 Object 1</i>	Object type [<i>switching, priority, value, percentage value</i>] as well as transmission behaviour and block function can be set individually for each channel.
<i>F1..F4 Object 2</i>	
<i>F1..F4 Dimming</i>	Type of control and block function
<i>F1..F4 Blinds</i>	Type of control, stop behaviour and block function
<i>F1..F4 Double-click</i>	Additional telegrams for <i>Dimming</i> and <i>Blinds</i> .

6.4.2 Dimming actuator C1

Parameter page	Description
Channel C1	
<i>Configuration options</i>	Characteristics of channel and activation of additional functions (soft switching, force, scenes, etc.).
<i>dimming response</i>	Load selection, dimming times, dimming switch-on value, etc.
<i>Dimming value limitations</i>	Scope of the limitation.
<i>Soft switching</i>	Brightness/dimming value and time settings for soft switching.
<i>Block function</i>	Type of block telegram and response to blocking.
<i>Feedback</i>	Format of the feedback objects and cyclical transmission time.
<i>Force</i>	Format of the force object and behaviour in forced operation.
<i>Scenes</i>	Selection of scene numbers relevant to the channel as well as assigned dimming values and dimming times
<i>Hour counter and service</i>	Type of counter, operating hours counter (up counter) or service interval (down counter).
<i>Diagnostic messages</i>	Activate transmission of the diagnostic and error notifications.
<i>Power failure and restoration</i>	Response after download or mains restoration.

⁴ (Position) describes the position of the push button, e.g. top left button

⁵ Only available if Control actuator directly = yes has been selected

6.5 General parameter page

Designation	Values	Description
<i>Use</i>	<i>2-way push button</i> <i>4-way push button</i>	A single rocker must be mounted on the device There are 2 button points available A double rocker must be mounted on the device There are 4 button points available
<i>Operation left</i> (only available if 4-way push button is selected, for 2-way push button left and right are combined)	<i>Single push button</i> <i>Rocker</i>	The two push buttons at the top left and bottom left are used as single push button. Different functions can be assigned via F1 and F2. The rocker function combines the two push buttons on the top left and bottom left into one rocker. This combines the functions F1 and F2 into one function.
<i>Operation right</i> (only available if 4-way push button is selected)	<i>Single push button</i> <i>Rocker</i>	The two push buttons at the top left and bottom left are used as single push button. Different functions can be assigned via F3 and F4. The rocker function combines the two push buttons on the top left and bottom left into one rocker. This combines the functions F3 and F4 into one function.
<i>Control actuator directly</i>	<i>No</i> <i>Yes</i>	The F1 button is used purely as a momentary-contact sensor, there is no internal connection to the dimming actuator. The F1 button is used exclusively as an input for dimming actuator channel C1. F1 is connected to C1 internally and has no communication objects
<i>Time for double-click</i>	<i>300 ms, 400 ms</i> <i>500 ms, 600 ms</i> <i>700 ms, 800 ms</i> <i>900 ms, 1 s</i>	Serves to differentiate between a double-click and 2 single clicks. Time period in which the second click must begin, in order to recognise a double-click.
<i>Long button push starting at</i>	<i>300 ms, 400 ms</i> <i>500 ms, 600 ms</i> <i>700 ms, 800 ms</i> <i>900 ms, 1 s</i>	Serves to differentiate between long and short button push. If the button is pressed for at least as long as the set time, then a long button push will be registered.
<i>Block telegram</i>	<i>Block with 1 (standard)</i>	0 = cancel block 1 = block

Designation	Values	Description
(direction of action applies to all channels)	<i>Block with 0</i>	0 = block 1 = cancel block

i First of all, the *Use* parameter should be used to define whether the device is to be used as a 2-way or a 4-way push button.

6.6 Parameter page F1..F4 button [position]⁶

Designation	Values	Description
Button F1		
<i>Description</i>	<i>Text field</i>	User-defined text for use as a function name.
<i>Function</i>	Switching (1 bit) <i>Dimming</i> <i>Blinds</i> Priority (2 bit) <i>Value 0-255 (1 byte)</i> <i>Percentage value (1 byte)</i>	Further parameter pages appear depending on the selected function
<i>Double-click additional function⁷</i>	no	No double-click function
	<i>yes</i>	The Double-click parameter page is displayed.
<i>How many telegrams are to be sent⁸</i>	One telegram <i>Two telegrams</i>	Each function has 2 output objects and can thus send up to 2 different telegrams.
The F2-F4 button, see the F1 button		

i The content of parameter pages F1 to F4 is identical, unless *Control actuator directly* is used, in which case F1 is internally connected to C1

⁶ (Position) describes the position of the push button, e.g. top left button

⁷ Only available with the dimming and blinds function

⁸ Only available with the switching, priority, value and percentage value functions

6.6.1 Control directly parameter page

This parameter page appears if the *Control actuator directly* parameter has been selected on the *General* page.

Designation	Values	Description
Response to long / short	One button operation	With direct control, <i>single button operation</i> is the fixed setting

6.6.2 Parameter page objects 1, 2 (operation = single push button)

Each of the two objects can be configured individually on its own parameter page, whereby the object type of object 1 is specified via the function of the button.

Designation	Values	Description
Object type (for object 2 if used)	Switching (1 bit) Priority (2 bit) Value 0-255 Percentage value (1 byte)	Telegram type for this object.
Send after short operation	Do not send Send telegram	Respond to short button push?
Telegram	With object type = switching 1 bit	
	Change over	Invert current state (ON-OFF-ON etc.)
	On	Send switch-on command
	Off	Send switch-off command
	With object type = priority 2 bit	
	No priority	Function: Priority not active (no control) Value: 0 (00 _{bin})
	Priority On	Function: Priority ON (control: enable, on) Value: 3 (11 _{bin})
	Priority Off	Function: Priority OFF (control: disable, off) Value: 2 (10 _{bin})
	With object type = value 0-255	
	0-255	Any value between 0 and 255 can be sent.
	With object type = percentage value 1 byte	
	0-100%	Any percentage value between 0 and 100% can be sent.
Send after long operation	do not send Send telegram	Respond to long button push?
Telegram	See above: Same object type as with short operation.	
Send after double-click	do not send Send telegram	Respond to double-click?
Telegram	See above: Same object type as with short operation.	
Use block function	No Yes	Block object for the respective channel is displayed, use can be configured individually for each object.



If a channel object is blocked, no telegrams are sent from this object. The second channel object can continue to send or can also be blocked.

6.6.3 Parameter page objects 1, 2 (operation = rocker)

Each of the two objects can be configured individually on its own parameter page, whereby the object type of object 1 is specified via the function of the button.

Designation	Values	Description
Object type (for object 2 if used)	Switching (1 bit) Priority (2 bit) Value 0-255 Percentage value (1 byte)	Telegram type for this object.
Send after short operation	do not send Send telegram	Respond to short button push?
Telegram	With object type = switching 1 bit	
	Top On / bottom Off	Top button switch-on command Bottom button switch off command
	<i>top change over / bottom change over</i>	Top button change over command Bottom button change over command
	<i>top Off / bottom On</i>	Top button switch off command Bottom button switch on command
	<i>top Off / bottom Off</i>	Top button switch off command Bottom button switch off command
	<i>top On / bottom On</i>	Top button switch-on command Bottom button switch on command
	With object type = priority 2 bit	
	Telegram top button	Function
	No priority	Priority not active (no control)
	Priority On	Priority ON (control: enable, on)
	Priority Off	Priority OFF (control: disable, off)
	Telegram bottom button	Function
	No priority	Priority not active (no control)
	Priority On	Priority ON (control: enable, on)
	Priority Off	Priority OFF (control: disable, off)
	With object type = value 0-255	
	Telegram top button	
	0-255	Any value between 0 and 255 can be sent.
	Telegram bottom button	
	0-255	Any value between 0 and 255 can be sent.
	With object type = percentage value 1 byte	
	Telegram top button	
	0-100%	Any percentage value between 0 and 100% can be sent.

Designation	Values	Description
	Telegram bottom button	
	0-100%	Any percentage value between 0 and 100% can be sent.
Send after long operation	do not send Send telegram	Respond to long button push?
Telegram	See above: Same object type as with short operation.	
Send after double-click	do not send Send telegram	Respond to double-click?
Telegram	See above: Same object type as with short operation.	
Use block function	No Yes	Block object for the respective channel is displayed, use can be configured individually for each object.

i If a channel object is blocked, no telegrams are sent from this object. The second channel object can continue to send or can also be blocked.

6.6.4 Dimming parameter page (operation = single push button)

i This function is available for channels F1-F4 if the function has been selected on the *button* or *rocker* parameter page. The respective channel object 2 is then omitted

Designation	Values	Description
Response to long/short		The input distinguishes between a long and a short button push, and can thus carry out 2 functions.
	One button operation	The dimmer is operated with a single push button. Short = On/Off Long = brighter/darker Release = stop
	Brighter / On	With the following variants, the dimmer is operated using 2 buttons (rocker). Short button push = On Long button push = brighter Release = stop
	Brighter / change over	Short = On / Off Long button push = brighter Release = stop
	Darker / Off	Short button push = Off Long button push = darker Release = stop

Designation	Values	Description
	<i>Darker / change over</i>	Short = On / Off Long = darker Release = stop
<i>Increment for dimming</i> (Parameter not available for <i>single button operation</i>)	100% 50% 25% 12.5% 6% 3% 1.5%	With a long button push, the dimming value is: Increased (or decreased) until the button is released. Increased by the selected value (or reduced)
<i>Use block function</i>	No Yes ⁹	Block object for the respective channel is displayed, use can be configured individually for each object.

6.6.5 Double-click parameter page (operation = single push button)

Designation	Values	Description
<i>Object type</i>	<i>Switching (1 bit)</i> <i>Priority (2 bit)</i> <i>Value 0-255</i> Percentage value (1 byte)	Telegram type for this object.
<i>Telegram</i>	<i>With object type = switching 1 bit</i>	
	Change over	Invert current state (ON- OFF-ON etc.)
	<i>On</i>	Send switch-on command
	<i>Off</i>	Send switch-off command
	<i>With object type = priority 2 bit</i>	
	<i>No priority</i> Priority On <i>Priority Off</i>	Function
		Value
		Priority not active (no control)
	<i>Priority On</i>	Priority On (control: enable, on)
		Priority Off (control: disable, off)
	<i>With object type = value 0-255</i>	
	0-255	Any value between 0 and 255 can be sent.
	<i>With object type = percentage value 1 byte</i>	
	0-100%	Any percentage value between 0 and 100% can be sent.
<i>Use block function</i>	No Yes ⁹	Block object for the respective channel is displayed, use can be configured individually for each object.

⁹ If a channel object is blocked, no telegrams are sent from this object. The second channel object (double-click) can continue to send or can also be blocked

6.6.6 Dimming parameter page (*operation = rocker*)

Designation	Values	Description
<i>Response to long/short</i>	<i>Top brighter / On, Bottom darker / Off</i> <i>Top brighter / change over, Bottom darker / change over</i>	The input distinguishes between a long and a short button push, and can thus carry out 2 functions. Top button: Short button push = On Long button push = brighter Release = stop Bottom button: Short button push = Off Long button push = darker Release = stop Top button: Short button push = On / Off Long button push = brighter Release = stop Bottom button: Short button push = On / Off Long button push = darker Release = stop
<i>Increment for dimming</i>	100% 50% 25% 12.5% 6% 3% 1.5%	With a long button push, the dimming value is: Increased (or decreased) until the button is released. Increased by the selected value (or reduced)
<i>Use block function</i>	No Yes	Block object for the respective channel is displayed, use can be configured individually for each object.



If a channel object is blocked, no telegrams are sent from this object. The second channel object (double-click) can continue to send or can also be blocked.

6.6.7 Double-click parameter page (*operation = rocker*)

Designation	Values	Description
<i>Object type</i>	Switching (1 bit) Priority (2 bit) Value 0-255 Percentage value (1 byte)	Telegram type for this object.
<i>Telegram</i>	With object type = switching 1 bit	
	Top On / bottom Off	Top button switch-on command Bottom button switch off command
	<i>Top change over / bottom change over</i>	Top button change over command Bottom button change over command
	<i>Top Off / bottom On</i>	Top button switch off command Bottom button switch on command
	<i>Top Off / bottom Off</i>	Top button switch off command Bottom button switch off command
	<i>Top On / bottom On</i>	Top button switch-on command Bottom button switch on command
	With object type = priority 2 bit	
	Telegram top button	Function Value
	<i>no priority</i>	Priority not active (no control) 0 (00 _{bin})
	Priority On	Priority On (control: enable, on) 3 (11 _{bin})
	<i>Priority Off</i>	Priority Off (control: disable, off) 2 (10 _{bin})
	Telegram bottom button	Function Value
	<i>no priority</i>	Priority not active (no control) 0 (00 _{bin})
	Priority On	Priority On (control: enable, on) 3 (11 _{bin})
	<i>Priority Off</i>	Priority Off (control: disable, off) 2 (10 _{bin})
	With object type = value 0-255	
	Telegram top button	
	0-255	Any value between 0 and 255 can be sent.
	Telegram bottom button	
	0-255	Any value between 0 and 255 can be sent.
	With object type = percentage value 1 byte	
	Telegram top button	
	0-100%	Any percentage value between 0 and 100% can be sent.
	Telegram bottom button	
	0-100%	Any percentage value between 0 and 100% can be sent.

Designation	Values	Description
<i>Use block function</i>	No <i>Yes</i>	Block object for the respective channel is displayed, use can be configured individually for each object.

6.6.8 Blinds parameter page (operation = single push button)



This function is available for channels F1-F4 if the function has been selected on the *button* or *rocker* parameter page. The respective channel object 2 is then omitted

Designation	Values	Description
<i>Operation</i>	<i>One button operation</i> <i>Down</i> <i>Up</i>	The input distinguishes between a long and a short button push, and can thus carry out 2 functions. The blinds are operated with a single push button. Short button push = step. Long button push = move. Short button push = step. Long button push = lower. Short button push = step. Long button push = raise.
<i>Movement is stopped by</i>	<i>Releasing the button</i> Short operation	Defines how the stop command is to be triggered.
<i>Use block function</i>	No <i>Yes</i>	Block object for the respective channel is displayed, use can be configured individually for each object.

6.6.9 Double-click parameter page (operation = single push button)

Designation	Values	Description
<i>Object type</i>	Switching (1 bit) Priority (2 bit) Value 0-255 Percentage value (1 byte) Height % + slat %	Telegram type for this object.
<i>Telegram</i>	With object type = switching 1 bit	
	Change over	Invert current state (ON- OFF- ON etc.)
	<i>On</i>	Send switch-on command
	<i>Off</i>	Send switch-off command
	With object type = priority 2 bit	
	<i>no priority</i>	Function Priority not active (no control)
	<i>Priority On</i>	Value Priority ON (control: enable, on)
	<i>Priority Off</i>	Value Priority OFF (control: disable, off)
	With object type = value 0-255	
	<i>0-255</i>	Any value between 0 and 255 can be sent.
	With object type = percentage value 1 byte	
	<i>0-100%</i>	Any percentage value between 0 and 100% can be sent.
	With object type = height % + slat %	
		Upon double-click two telegrams are sent simultaneously:
	<i>Height</i>	Desired height of blinds in per cent
	<i>Slat</i>	Desired slat position in per cent
<i>Use block function</i>	No <i>Yes</i>	Block object for the respective channel is displayed, use can be configured individually for each object.

6.6.10 Blinds parameter page (operation = rocker)

Designation	Values	Description
<i>Operation</i>	Top button Up Bottom button Down (This value is fixed and cannot be changed)	The input distinguishes between a long and a short button push, and can thus carry out 2 functions. Top button: Short button push = step. Long button push = raise. Bottom button: Short button push = step. Long button push = lower.
<i>Movement is stopped by</i>	<i>Releasing the button</i> Short operation	Defines how the stop command is to be triggered.
<i>Use block function</i>	No Yes	Block object for the respective channel is displayed, use can be configured individually for each object.

6.6.11 Double-click parameter page (operation = rocker)

Designation	Values	Description
<i>Object type</i>	<i>Switching (1 bit)</i> <i>Priority (2 bit)</i> <i>Value 0-255</i> <i>Percentage value (1 byte)</i> Height % + slat %	Telegram type for this object.
<i>Telegram</i>	With object type = switching 1 bit	
	Top On / bottom Off	Top button switch-on command Bottom button switch off command
	<i>Top change over / bottom change over</i>	Top button change over command Bottom button change over command
	<i>Top Off / bottom On</i>	Top button switch off command Bottom button switch on command

Designation	Values	Description
	<i>Top Off / bottom Off</i>	Top button switch off command Bottom button switch off command
	<i>Top On / bottom On</i>	Top button switch-on command Bottom button switch on command
	<i>With object type = priority 2 bit</i>	
	Telegram top button	Function Value
	<i>No priority</i>	Priority not active (no control) 0 (00 _{bin})
	Priority On	Priority ON (control: enable, on) 3 (11 _{bin})
	<i>Priority Off</i>	Priority OFF (control: disable, off) 2 (10 _{bin})
	Telegram bottom button	Function Value
	<i>No priority</i>	Priority not active (no control) 0 (00 _{bin})
	Priority On	Priority ON (control: enable, on) 3 (11 _{bin})
	<i>Priority Off</i>	Priority OFF (control: disable, off) 2 (10 _{bin})
	<i>With object type = value 0-255</i>	
	Telegram top button	
	0-255	Any value between 0 and 255 can be sent.
	Telegram bottom button	
	0-255	Any value between 0 and 255 can be sent.
	<i>With object type = percentage value 1 byte</i>	
	Telegram top button	
	0-100%	Any percentage value between 0 and 100% can be sent.
	Telegram bottom button	
	0-100%	Any percentage value between 0 and 100% can be sent.
	<i>With object type = height % + slat %</i>	
	Telegram top button	Upon double-click two telegrams are sent simultaneously:
	<i>Height</i>	Desired height of blinds in per cent
	<i>Slat</i>	Desired slat position in per cent
	Telegram bottom button	Upon double-click two telegrams are sent simultaneously:
	<i>Height</i>	Desired height of blinds in per cent

Designation	Values	Description
	<i>Slat</i>	Desired slat position in per cent
<i>Use block function</i>	No <i>Yes</i>	Block object for the respective channel is displayed, use can be configured individually for each object.

6.7 Parameters for the dimming actuator C1

6.7.1 Parameter page: Configuration options

Designation	Values	Description
<i>Description</i>	<i>Text field</i>	User-defined text for use as a function name.
<i>Adjust dimming value limitations</i>	No <i>Yes</i>	The standard values apply: <i>Implement limit when executing the object = no</i> <i>Limit applies for:</i> - <i>Soft switching,</i> - <i>absolute dimming,</i> - <i>relative dimming,</i> - <i>switch command</i> <i>= no</i> The page <i>Dimming value limitations</i> will be shown and all parameters can be adjusted individually.
<i>Adjust soft switching</i>	No <i>Yes</i>	The standard values apply: - <i>Time for Soft ON = 1 min</i> - <i>Dimming value after Soft ON = 100%</i> - <i>Time between Soft ON and Soft OFF = 5 min</i> - <i>Time for Soft OFF = 1 min</i> The page <i>Soft switching</i> will be shown and all parameters can be adjusted individually.
<i>Adjust block function</i>	No <i>Yes</i>	The standard values apply: - <i>Block with 1 (standard)</i> - <i>Response at:</i> <i>Setting the block = 10%</i> <i>Cancelling the block = update</i> The page <i>Block function</i> will be shown and all parameters can be adjusted individually.

Designation	Values	Description
Adjust feedback	No	The standard values apply: - <i>Format of 1-bit feedback = not inverted</i> - <i>Send 1-bit feedback cyclically = no</i> - <i>Send 8-bit feedback = only after ending the dimming process.</i> - <i>Send 8-bit feedback cyclically = no</i> - <i>Time for cyclical transmission of feedback = 60 min</i>
	Yes	The page Feedback will be shown, and all parameters can be adjusted individually.
Activate force function	No	No force function.
	Yes	The Force function page will be shown.
Activate scenes	No	Do not use scenes.
	Yes	The Scenes page will be shown
Activate hour counter	No	No hour counter.
	Yes	The page Hour counter will be shown.
Activate diagnostic messages	No	no diagnostic messages
	Yes	The Diagnostic messages page will be shown.

6.7.2 Parameter page: Dimming response

Designation	Values	Description
Load selection	Automatic	The dimmer detects what type of load is connected and automatically selects the appropriate dimming strategy (leading edge or trailing edge).
	<i>RC load (LED/incandescent lamps, electron. transformers)</i>	Trailing edge phase control for resistive and capacitive loads (LED lamps, incandescent lamps, halogen high-voltage lamps, etc.). For electronic transformers/power units designated for use with RC mode dimmers (trailing edge phase ctrl.). Note: When selecting RC mode, a load detection will always be performed as a precaution. This should prevent the dimmer from being damaged (e.g. wound transformer) when an L-load is connected. The RC mode (trailing edge control) is actually only used when no L-load is detected.

Designation	Values	Description
	<i>L-load (wound transformers)</i> <i>Fan (soft switching deactivated)</i> <i>LEDs (RC, 0-90%)</i> <i>Reserve 2</i> ... <i>Reserve 32</i>	Leading edge phase control for inductive loads, e.g. wound transformers, but also leading edge LED lamps. Not suitable for electronic transformers, can lead to a dimmer overload. Special mode for fans, with configurable start-up time (see below). Only for LED lamps that cannot be dimmed down at 100% (trailing edge control). Do not use.
<i>Start-up time</i>	2-60 s Default = 10 s	Only with <i>Load selection</i> = fan. Time for which the fan must be controlled with full voltage, until it has reached a specific speed.
<i>Minimum dimming value</i>	1%, 5%, 10% , 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%	Minimum dimming value for all dimming processes (except 0%). Any values (<i>switch-on dimming value</i> , <i>response to bus failure</i> etc.) which are below this threshold are increased to the <i>Minimum dimming value</i> .
<i>Dimming time 1 from 0% to 100%</i>	1 s, 2 s, 4 s 6 s, 8 s, 12 s, 15 s, 24 s, 30 s, 60 s	This parameter defines the maximum dimming speed from 0 to 100% For greater flexibility, 3 different values can be specified. (see below).
<i>Dimming time 2 from 0% to 100%</i>	1 s, 2 s, 4 s 6 s, 8 s , 12 s, 15 s, 24 s, 30 s, 60 s	2nd pre-selectable dimming time.
<i>Dimming time 3 from 0% to 100%</i>	1 s, 2 s, 4 s 6 s, 8 s, 12 s , 15 s, 24 s, 30 s, 60 s	3rd pre-selectable dimming time.
<i>When receiving a switch command (1-bit)</i>	<i>immediate on</i> Soft on with dimming time 1 <i>Soft on with dimming time 2</i> <i>Soft on with dimming time 3</i>	The change from 0% to 100% or 100% to 0% takes place within max. 1 s. The change from 0% to 100% or 100% to 0% takes place within the preset dimming time.
<i>When receiving a dimming command (4-bit)</i>	<i>Immediate on</i>	The change from 0% to 100% or 100% to 0% takes place within max. 1 s (in very quick increments), but can be interrupted by a stop command (release button).

Designation	Values	Description
	Soft on with dimming time 1 <i>Soft on with dimming time 2</i> <i>Soft on with dimming time 3</i>	The change from 0% to 100% or 100% to 0% takes place within the preset dimming time in correspondingly slower intermediate increments.
When receiving an absolute value (8-bit)	<i>Immediate on</i> Soft on with dimming time 1 <i>Soft on with dimming time 2</i> <i>Soft on with dimming time 3</i>	The received dimming value is adopted immediately (max. delay 1 s). The change to the new dimming value takes place within the preset dimming time, proportionately to the change in value. Example with dimming time 1 = 12 s: Change from: - 0 to 100% or 100 to 0% in 12 s (= 100% of 12 s) - 25 to 50% or 50 to 25% in 3 s (= 25% of 12 s)
Switch-on value	Value before previous switch-off <i>minimum value</i> 100%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%	The last dimming value before switching off is saved and restored. The configured minimum value is applied. The dimmer assumes the selected value when it is switched on. Here again, the configured <i>Minimum dimming value</i> needs to be taken into account.
Switch-on with 4-bit dimming telegram	 <i>No</i> Yes	Defines the response if the channel is switched off and a 4-bit telegram (brighter) is received. See appendix: 4-bit telegrams (brighter/darker). Channel status remains unchanged. Channel is switched on and dimmed.
Switch off with 4-bit dimming telegram	 <i>No</i> Yes	Defines the response if the channel is switched on and a 4-bit telegram (darker) is received. See appendix: 4-bit telegrams (brighter/darker). Channel status remains unchanged. Channel is switched off.

6.7.3 Parameter page: Dimming value limits

i The dimming value can be temporarily restricted via object *Dimming value limitation*. This is used, for example, to ensure that basic lighting is not exceeded at night, while during the evening the full range of lighting can be used.

The function is implemented as follows:

If the object value = 0, the dimming value is not restricted.

If the object value is greater than 0, then this value indicates the limit for the dimming value.

If the object value is smaller than the configured *minimum dimming value*, then the brightness is restricted to this minimum dimming value.

If the restriction is removed, the dimming value continues to remain restricted until a new dimming command is received.

During the restriction, the Soft ON and Soft OFF times are adjusted in such a way that the speed of the brightness change remains the same as when there are no restrictions.

Designation	Values	Description
<i>Perform limitation when writing to object</i>	No Yes	Limitation will not take effect until the next dimming process. Limit the dimming value as soon as a value is received on the <i>Dimming value limitation</i> object.
<i>Limitation applies to switch command (1-bit)</i>	No Yes	No limitation during switch commands. Limitation is effective.
<i>Limitation applies to relative dimming (4-bit)</i>	No Yes	No limitation during brighter / darker commands. Limitation is effective.
<i>Limitation applies to absolute dimming (8-bit)</i>	No Yes	No limitation for percentage value telegrams. Limitation is effective.
<i>Limitation applies to soft switching</i>	No Yes	No limit for soft switching Limitation is effective.

6.7.4 Parameter page: Soft switching

Designation	Values	Description
<i>Time for Soft ON</i>	0 s, 1 s, 2 s, 4 s 6 s, 8 s, 12 s, 15 s 24 s, 30 s, 45 s, 1 min 2 min, 3 min, 4 min, 5 min 6 min, 7 min, 8 min, 9 min 10 min, 12 min, 15 min, 20 min 30 min, 40 min, 50 min, 60 min	Duration of the dimming-up phase (t1) for soft switching. 0 s = switch on immediately.  See appendix for further details: <u>Soft switching</u> .
<i>Dimming value after Soft ON</i>	10%, 20%, 30% 40%, 50%, 60%, 70%, 80%, 90%, 100%	Final value at the end of Soft ON phase (Val) Comment: Here again, the configured <i>Minimum dimming value</i> needs to be taken into account.
<i>Time between Soft ON and Soft OFF</i>	<i>Until Soft OFF telegram</i> 1 s, 2 s, 3 s, 4 s 5 s, 6 s, 7 s, 8 s, 9 s 10 s, 15 s, 20 s, 30 s 40 s, 50 s, 1 min, 2 min 3 min, 4 min, 5 min , 6 min 7 min, 8 min, 9 min, 10 min 12 min, 15 min, 20 min, 30 min, 40 min, 50 min, 60 min	No time restriction; Soft OFF phase is initiated by a telegram. Delay (t2) until the start of the Soft OFF phase
<i>Time for Soft OFF</i>	0 s, 1 s, 2 s, 4 s 6 s, 8 s, 12 s, 15 s 24 s, 30 s, 45 s, 1 min 2 min, 3 min, 4 min, 5 min 6 min, 7 min, 8 min, 9 min 10 min, 12 min, 15 min, 20 min, 30 min, 40 min, 50 min, 60 min	Duration of the Soft OFF phase (t3). 0 s = switch off immediately  See appendix for further details: <u>Soft switching</u> .

6.7.5 Parameter page: Block function

Designation	Values	Description
Block telegram	Block with 1 (standard) Block with 0	0 = cancel block 1 = block 0 = Block 1 = cancel block  The block is always deactivated after reset.
Response when setting the block	no change 100% 0%, 10% , 20%, 30% 40%, 50%, 60%, 70%, 80%, 90%	No response. Dim to the set value
Response when the block is cancelled	No change Update 100%, 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%	No response. If a telegram was received during the block: Apply state. Otherwise: Restore state before the block. Dim to the set value

6.7.6 Parameter page: Feedback

Designation	Values	Description
Format of 1-bit feedback	Not inverted Inverted	Standard setting: 1-100% = 1 0% = 0 1-100% = 0 0% = 1
Send 1-bit feedback cyclically	No Yes	Send at regular intervals?
Send 8-bit feedback	Only after ending the dimming process Every 10% Every 20% Every 30%	Only send current dimming value when the new dimming value has been reached. Send even during the dimming process
Send 8-bit feedback cyclically	No Yes	Send at regular intervals?
Time for cyclical transmission of feedback (if available)	2 min, 3 min, 5 min, 10 min, 15 min, 20 min, 30 min, 45 min, 60 min	At what interval? This setting applies for both feedback objects (1 and 8-bit)

6.7.7 Parameter page: Force

Designation	Values	Description
<i>Format of force object</i>	1 bit 2 bit 1 byte (%)	Force is triggered by: Switch telegram. Priority telegram. dimming value
1 bit		
<i>Activate force function with</i>	1 0	Recommended. After reset/download, forced operation is already activated and must be cancelled if necessary.
<i>Behaviour at start of force</i>	No change <i>Minimum value</i> 100% Off 10%, 20%, 30% 40%, 50%, 60% 70%, 80%, 90%	Response to the receipt of a force telegram. Here again, the configured <i>Minimum dimming value</i> needs to be taken into account.
<i>Behaviour at end of force</i>	Update ¹⁰ Value before force <i>Minimum value</i> 100% OFF 10%, 20%, 30% 40%, 50%, 60% 70%, 80%, 90%	Response to cancellation of force. Here again, the configured <i>Minimum dimming value</i> needs to be taken into account.
2 bit		
<i>Behaviour at force ON</i>	No change <i>Minimum value</i> 100% Off 10%, 20%, 30% 40%, 50%, 60% 70%, 80%, 90%	Response to the receipt of a force telegram. Here again, the configured <i>Minimum dimming value</i> needs to be taken into account.
<i>Behaviour at force OFF</i>	Off	This value is fixed and cannot be changed
<i>Behaviour at end of force</i>	Update ¹¹	Response to cancellation of force.

¹⁰ 4-bit commands received during the force (brighter/darker) will not be considered. Soft ON and Soft OFF processes will be aborted.

¹¹ 4-bit commands received during the force (brighter/darker) will not be considered.

Designation	Values	Description
	Value before force <i>minimum value</i> <i>100%</i> <i>Off</i> <i>10%, 20%, 30%</i> <i>40%, 50%, 60%</i> <i>70%, 80%, 90%</i>	Here again, the configured <i>Minimum dimming value</i> needs to be taken into account.
1 byte (%) ¹²		
<i>Behaviour at end of force</i>	<i>update</i> ¹¹ Value before force <i>Minimum value</i> <i>100%</i> <i>Off</i> <i>10%, 20%, 30%</i> <i>40%, 50%, 60%</i> <i>70%, 80%, 90%</i>	Response to cancellation of force. Here again, the configured <i>Minimum dimming value</i> needs to be taken into account.

Soft ON and Soft OFF processes will be aborted.

¹² The triggering telegram acts simultaneously as a force dimming value

6.7.8 Parameter page: Scenes

The dimming channel C1 can participate in up to 8 scenes.

Designation	Values	Description
<i>Block telegram for scenes</i>	Block with 1 (standard) <i>Block with 0</i>	0 = cancel block 1 = block 0 = Block 1 = cancel block Note: With this setting, the scenes are always blocked immediately after reset or download.
<i>All channel scene statuses</i>	Overwrite on download <i>Unchanged after download</i>	A download deletes all scene memories of a channel, i.e. all previously taught-in scenes. When a scene number is called up, the channel assumes the configured assigned dimming value (see below). See appendix: Entering scenes without telegrams All previously taught-in scenes are saved. However, the scene numbers to which the channel should react can be changed (see below: <i>Channel reacts to</i>).
<i>Channel reacts to¹³</i>	<i>No scene number</i> <i>Scene number 1</i> ... <i>Scene number 63</i>	Scene numbers which can be set, to which the channel is to react.
<i>Assigned dimming value¹³</i>	<i>Off</i> <i>10%, 20%, 30%</i> <i>40%, 50%, 60%,</i> <i>70%, 80%, 90%, 100%</i>	Dimming value to be assigned to the selected scene number. Only possible if the scene statuses are to be overwritten after download.
<i>Behaviour when receiving the scene number¹³</i>	<i>Immediate on</i>	The assigned dimming value is adopted immediately (max. delay 1 s).
	<i>Soft on with dimming time 1</i> <i>Soft on with dimming time 2</i> <i>Soft on with dimming time 3</i>	The change to the assigned dimming value takes place within the preset dimming time (see Dimming response parameter page)
<i>Permit teach-in¹³</i>	<i>No</i>	Scenes can only be called up.
	Yes	The user can both call up and teach in or amend scenes.

¹³ Parameter is available once for each of the 8 scenes

6.7.9 Parameter page: Hour counter and service

Designation	Values	Description
<i>Type of hour counter</i>	Hour counter <i>Counter for time to next service</i>	Forward counter for channel duty cycle. Backward counter for channel duty cycle.
Hour counter		
<i>Reporting of operating hours in the event of a change (0..100 h, 0 = no report)</i>	<i>0..100</i> Default value = 10	At what interval is the current counter reading to be sent? Example: 10 = Send each time the counter reading increases by another 10 hours.
<i>Report operating hours cyclically</i>	No Yes	Defines whether to send at regular intervals.
<i>Time for cyclical transmission</i>	<i>2 min, 3 min, 5 min, 10 min, 15 min, 20 min, 30 min, 45 min, 60 min</i>	At what interval?
Counter for time to next service		
<i>Service interval (x10 h)</i>	<i>0..2000</i> Default value = 100	Desired time between 2 services. Example: 10 = 10 x 10 h = 100 hours
<i>Reporting of time to service in the event of a change (0 = no report)</i>	<i>0..100</i> Default value = 10	At what interval is the current counter reading to be sent? Example: 10 = Send each time the counter reading decreases by another 10 hours.
<i>Report time to service cyclically</i>	No Yes	Send remaining time to next service at regular intervals? → Object Time to next service.
<i>Report service cyclically</i>	No Yes	Send expiry of time to next service at regular intervals? → Object Service required".
<i>Time for cyclical transmission (if used)</i>	<i>2 min, 3 min, 5 min, 10 min, 15 min, 20 min, 30 min, 45 min, 60 min</i>	At what interval?

6.7.10 Parameter page: Diagnostic messages

Designation	Values	Description
<i>Send general error cyclically</i>	No Yes	Which messages should be sent cyclically?
<i>Send short circuit cyclically</i>	No Yes	
<i>Send excess temperature cyclically</i>	No Yes	
<i>Send mains failure cyclically</i>	No Yes	
<i>Send load type cyclically</i>	No Yes	
<i>Cycle time for all diagnostic messages (if used)</i>	2 min, 3 min, 5 min, 10 min, 15 min, 20 min, 30 min, 45 min, 60 min	At what interval?

6.7.11 Parameter page: Power failure and restoration

Designation	Values	Description
<i>Dimming value after download or mains restoration</i>	Same as before failure 100%, 0%, 10%, 20%, 30% 40%, 50%, 60% 70%, 80%, 90%	Restore status before download or maintain status before mains failure. Apply set value here. Here again the configured minimum dimming value needs to be taken into account.

7 Typical applications

- i** These application examples are designed to aid planning and are not to be considered an exhaustive list. They can be supplemented and extended as desired. Standard or customer-defined parameter settings apply for the parameters not listed here.

7.1 Direct control of dimming actuator (rocker) and blinds (rocker)

In this configuration, the dimming actuator channel C1 of the wireless push-button PD 1 RF KNX is operated **directly** with the F1 button. The light should be made brighter or darker by adjusting the dimming when the left rocker is pressed. A double-click should always lead to switching off.

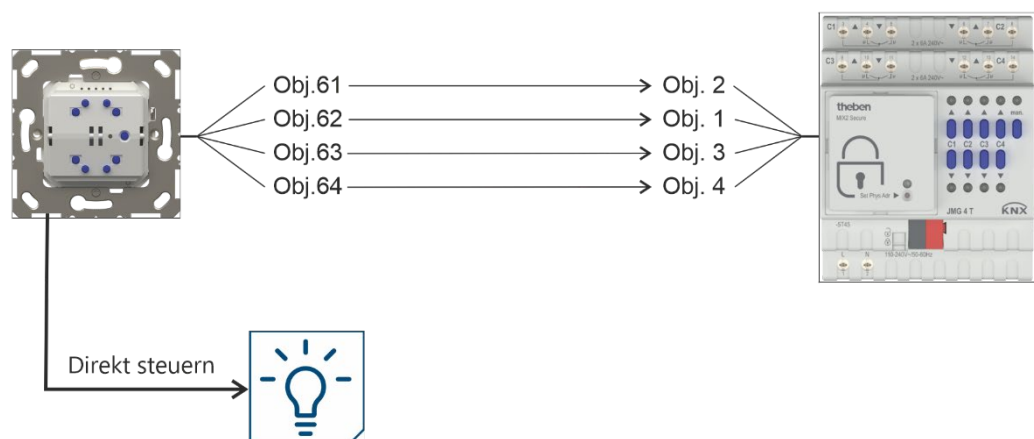
A blinds actuator JMG 4 T should be controlled by pressing the right rocker F3:

- Long press at top should result in raising
- Long press at bottom should result in lowering
- Movement should stop when the button is released
- Double-click should always result in raising

7.1.1 Devices

- PD 1 RF KNX (4941675)
- JMG 4 T (4930250) with application version 2.1

7.1.2 Overview



7.1.3 Objects and links

Links:

No.	PD 1 RF KNX Object name	No.	JMG 4 T Object name	Comment
61	<i>F3 Step/Stop</i>	2	<i>JMG 4 T C1 Step/Stop</i>	PD 1 RF KNX sends operating commands to JMG 4 T
62	<i>F3 up/down</i>	1	<i>JMG 4 T C1 UP/DOWN</i>	
63	<i>F3.1 Height %</i>	3	<i>JMG 4 T C1 % Height</i>	
64	<i>F3.1 Slat %</i>	4	<i>JMG 4 T C1 % Slat</i>	

7.1.4 Important parameter settings

PD 1 RF KNX:

Parameter page	Parameters	Setting
General	<i>Use</i>	<i>4-way push button</i>
	<i>Operation left</i>	<i>Rocker</i>
	<i>Operation right</i>	<i>Rocker</i>
	<i>Control actuator directly</i>	<i>Yes</i>
F1		
<i>Rocker left</i>	<i>Double-click additional function</i>	<i>Yes</i>
<i>Control directly</i>	<i>Response to long/short</i>	<i>Top brighter/On, Bottom darker/Off</i>
<i>Double-click</i>	<i>Top button dimming value</i>	<i>0%</i>
	<i>Bottom button dimming value</i>	<i>0%</i>
F3		
<i>Rocker right</i>	<i>Function</i>	<i>Blinds</i>
	<i>Double-click additional function</i>	<i>Yes</i>
<i>Blinds</i>	<i>Movement is stopped by</i>	<i>Releasing the button</i>
<i>Double-click</i>	<i>Object type</i>	<i>Height% + slat%</i>
	<i>Top button height and slat</i>	<i>0%</i>
	<i>Bottom button height and slat</i>	<i>0%</i>

JMG 4 T:

Parameter page	Parameters	Setting
JMG 4 T C1:	<i>Type of hanging</i>	<i>Blinds</i>
Drive settings	<i>Select blinds-specific settings</i>	

7.2 Direct control of dimming actuator and another lighting group (2-way push button)

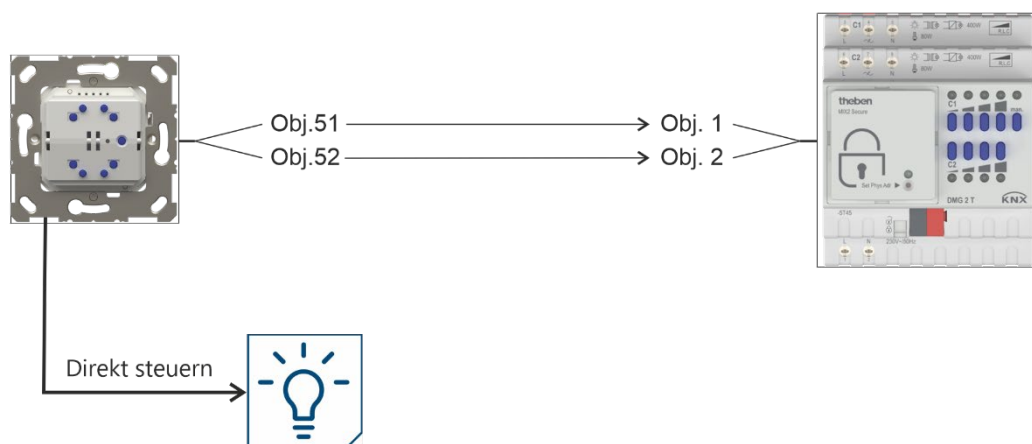
In this configuration, the dimming actuator channel C1 of the wireless push-button PD 1 RF KNX is operated **directly** with the F1 button. The light should be made brighter or darker by adjusting the dimming and switched On/Off when the single button F1 is pressed.

A dimming actuator DMG 2 T should be controlled by pressing the single button F2; here too, the light should be made brighter or darker by adjusting the dimming and switched on/off when the single button F2 is pressed.

7.2.1 Devices

- PD 1 RF KNXKNX (4941675)
- DMG 2 T (4930270) with application version 2.1

7.2.2 Overview



7.2.3 Objects and links

Links:

No.	PD 1 RF KNX Object name	No.	JMG 4 T Object name	Comment
51	<i>F2 switching</i>	1	<i>DMG 2 T Switching ON/OFF</i>	PD 1 RF KNXKNX sends dimming commands to DMG 2 T
52	<i>F2 Brighter/darker</i>	2	<i>DMG 2 T Brighter/Darker</i>	

7.2.4 Important parameter settings

PD 1 RF KNX:

Parameter page	Parameters	Setting
<i>General</i>	<i>Use</i>	<i>2-way push button</i>
	<i>Operation</i>	<i>Single push button</i>
	<i>Control actuator directly</i>	<i>Yes</i>
<i>F1</i>		
<i>Top button</i>	<i>Double-click additional function</i>	<i>No</i>
<i>Control directly</i>	<i>Response to long/short</i>	<i>One button operation</i>
<i>F2</i>		
<i>Bottom button</i>	<i>Function</i>	<i>Dimming</i>
	<i>Double-click additional function</i>	<i>No</i>
<i>Dimming</i>	<i>Response to long/short</i>	<i>One button operation</i>

DMG 2 T:

Parameter page	Parameters	Setting
<i>DMG 2 T C1</i>		
<i>dimming response</i>	<i>Switch-on with 4-bit dimming telegram</i>	<i>Yes</i>
	<i>Switch off with 4-bit dimming telegram</i>	<i>Yes</i>

8 Appendix

8.1 General information about KNX RF

As with KNX TP, KNX RF also distinguishes between Standard and Easy mode. The standard mode is called "KNX RF1.R S mode". The carrier frequency is 868.3 MHz. This relatively low frequency offers excellent signal propagation compared to higher frequencies (Bluetooth: 2.4 GHz or WLAN: 2.4/5 GHz) and a good balance between power consumption and range. The range in the free field is up to 100 m. Inside buildings, the range depends on structural factors and conditions.

The structural conditions and distances between the radio products must already be taken into account when planning the electrical installation. The radio signals are mainly dampened by e.g. concrete components with steel reinforcement or metal components. The more dampening components between transmitter and receiver and the greater the distance, the more critical for the radio communication. For a system with TP and RF lines, the placement of the media coupler must be planned as much in the centre as possible.

Furthermore, the frequency range used by KNX RF is not exclusively available to KNX. This means other radio systems might also be in a building and influence the KNX RF communication (e.g. garage door drives, alarm systems, weather stations, etc.).

Other devices, such as ballasts and lamps, can also be potential sources of interference for KNX RF systems due to the emission of electromagnetic waves.

The ETS app *KNX RF Field Strength Analyzer* from Tapko Technologies GmbH shows the receiving field strength of selected KNX RF products and can support start-up and troubleshooting.

In ETS 5, the "RF" transmission medium can be selected for a line. The KNX RF products are included in this line. For each line with "RF" medium, the ETS generates a unique domain address. The KNX RF products added in the RF line are assigned to this domain address. This ensures that pieces of information from neighbouring KNX RF lines will not influence each other. Only devices with the same domain address communicate with each other. The domain address is automatically transmitted by the ETS when programming the KNX RF products. An RF line can have a maximum of 256 devices (addresses 0...255). If the system consists of several RF lines or a combination of TP and RF media, the first device in the RF line is always a media coupler with the physical address x.x.0 (e.g. 1.2.0). The media coupler transmits the information across all lines via the TP medium. KNX-RF products can be easily recognised in the ETS product catalogue thanks to the specific wireless symbol. 

8.2 Soft switching

8.2.1 General

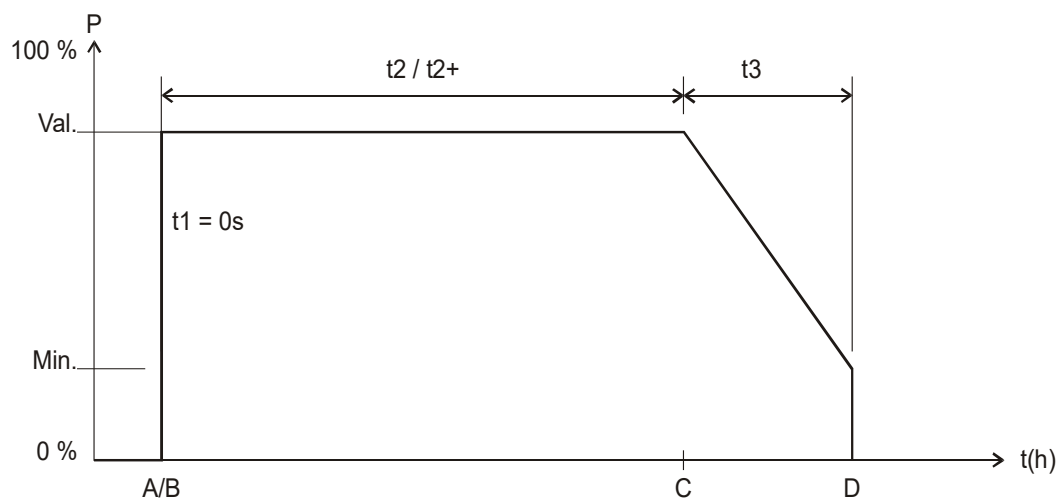
The soft switch function is a cycle consisting of switch-on, dimming up, maintain target brightness, dimming down and switch-off.

8.2.2 Soft ON for staircase lighting

The following function is recommended for staircase lighting:

When the light push button is operated: Full brightness.

After required length of time: Lighting is slowly dimmed down and then switched off.



A	Push button sends <i>Soft ON</i> telegram.
t1	The <i>Soft ON time</i> is equal to 0s, i.e. the "Dim up slowly" function is deactivated
B	The brightness is immediately adjusted to the configured <i>Dimming value after Soft ON</i>
t2	Configured <i>Time between Soft ON and Soft OFF</i> ¹⁴ elapses
t2+	Perhaps, t2 has been extended with another <i>Soft ON</i> telegram
C	t2 or t2+ has elapsed, or a <i>Soft OFF</i> telegram was received: Start of the <i>Soft OFF</i> phase
t3	the brightness is gradually reduced within the configured <i>Time for Soft OFF</i>
D	t3 has elapsed, the configured <i>minimum dimming value</i> has been reached and the system dims to 0%

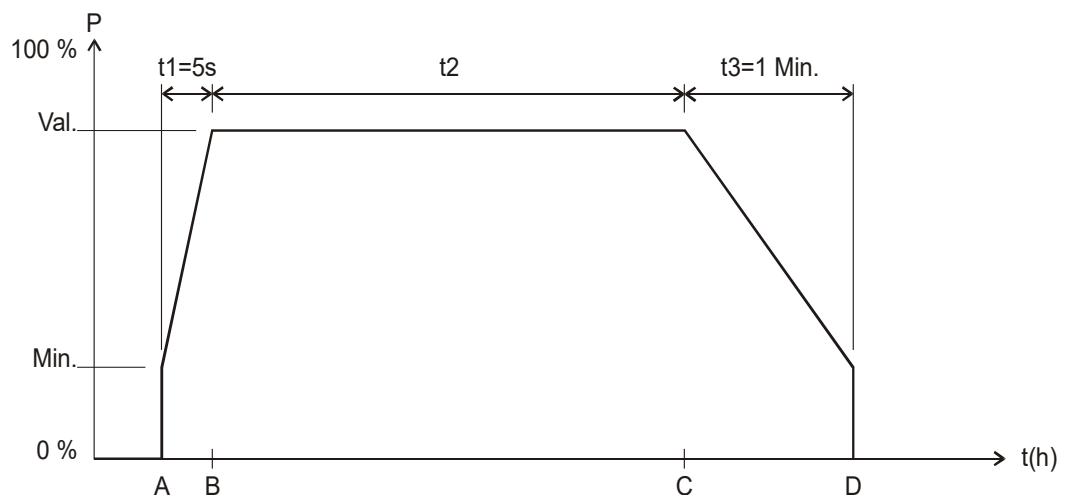
The light can be turned off with a Soft OFF telegram or retriggered with a Soft ON telegram.

¹⁴ Soft OFF via configured time or via Soft OFF telegram.

8.2.3 Driveway lighting

A motion detector activates the dimmer via the *Soft switching* object. The lighting is dimmed up within 5 seconds if a movement is detected. This delay gives the eyes enough time to adjust to the light without being dazzled.

The lighting is gradually dimmed down within a minute and then switched off after the configured time has elapsed or a Soft OFF telegram is received via the push button or via the motion detector (cyclic).

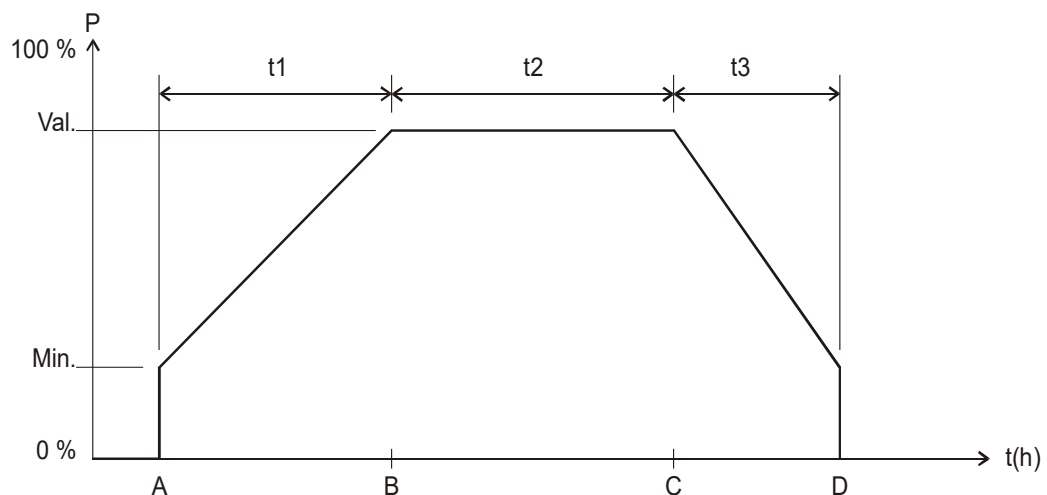


A	<i>Soft ON</i> is sent by the motion detector: The brightness is adjusted to the configured <i>minimum dimming value</i>
t1	The brightness is gradually increased within the configured time for <i>Soft ON</i> (5 s)
B	Configured <i>Dimming value after Soft ON</i> is reached
t2	Configured <i>Time between Soft ON and Soft OFF</i>
C	<i>Soft OFF</i> telegram was received or configured time has elapsed: Start of the <i>Soft OFF</i> phase
t3	The brightness is gradually reduced within the configured time for <i>Soft OFF</i>
D	t3 has elapsed, the configured <i>minimum dimming value</i> has been reached and the system dims to 0%

8.2.4 Simulation of daily routine

Using a time switch, it is possible to simulate an entire daily routine with sunrise and sunset. To do this, the *Time between Soft ON and Soft OFF* parameter needs to be set to *Until Soft OFF telegram* (See object *Soft switching*).

The time switch sends a Soft ON telegram (=1) in the morning and a Soft OFF telegram (=0) in the evening to object *Soft switching*.



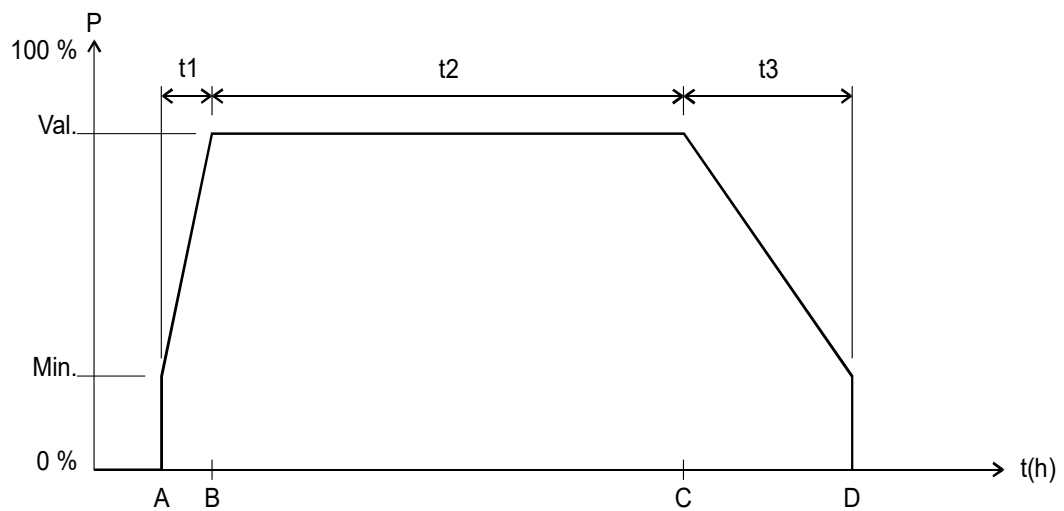
Min.	Configured <i>Minimum dimming value</i>
Val.	Target dimming value, i.e. configured <i>Dimming value after Soft ON</i>
t(h)	Time sequence

A	<i>Soft ON</i> is sent by the timer: The brightness is immediately adjusted to the configured <i>Minimum dimming value</i>
t1	The brightness is gradually increased within the configured <i>Time for Soft ON</i>
B	Configured <i>Value after Soft ON</i> is reached
t2	<i>Time between Soft ON (1) and Soft OFF telegram (0)</i> programmed in the time switch
C	<i>Soft OFF</i> telegram has been received: Start of the <i>Soft OFF</i> phase
t3	The brightness is gradually reduced within the configured <i>Time for Soft OFF</i>
D	t3 has elapsed, the configured <i>minimum dimming value</i> has been reached and the system dims to 0%

8.2.5 Retriggering and premature switch off

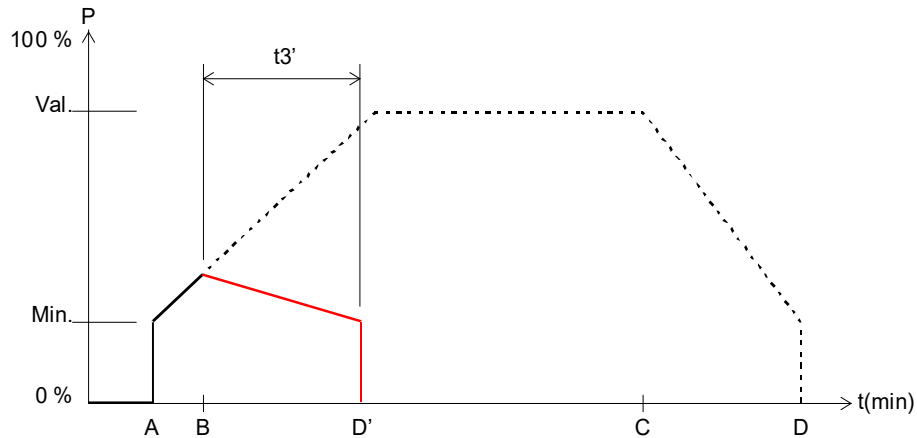
It is also possible to influence the soft switching process while it is still active. Depending on which phase is currently being executed, the following responses can be triggered by Soft ON and Soft OFF telegrams.

Telegram	Response
Soft ON during t1	none
Soft ON during t2	t2 is restarted
Soft ON during t3	a new Soft ON process is started. See below.
Soft OFF during t1	The Soft ON process is stopped and the Soft OFF phase started immediately. See below.
Soft OFF during t2	the Soft OFF phase starts immediately
Soft OFF during t3	none

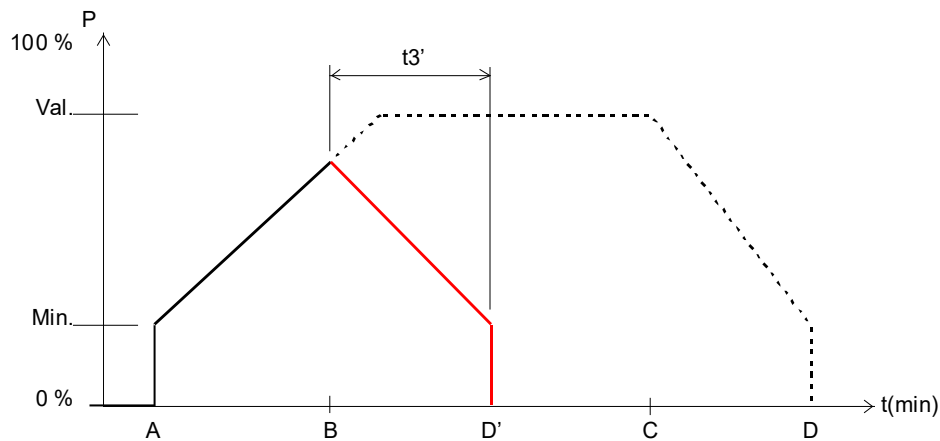


8.2.6 Soft OFF telegram during a Soft ON process

The duration of the Soft OFF phase (t_3') is always equivalent to the configured time, regardless of the current dimming value.



Example 1: Soft OFF at the start of the Soft ON phase.

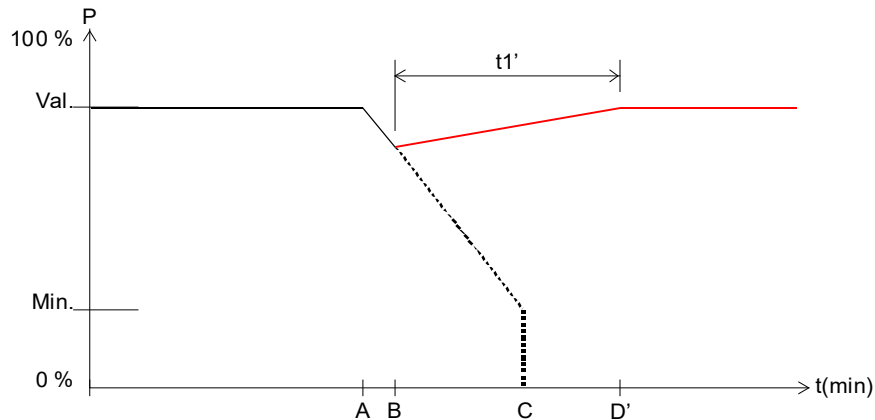


Example 2: Soft OFF at the end of the Soft ON phase.

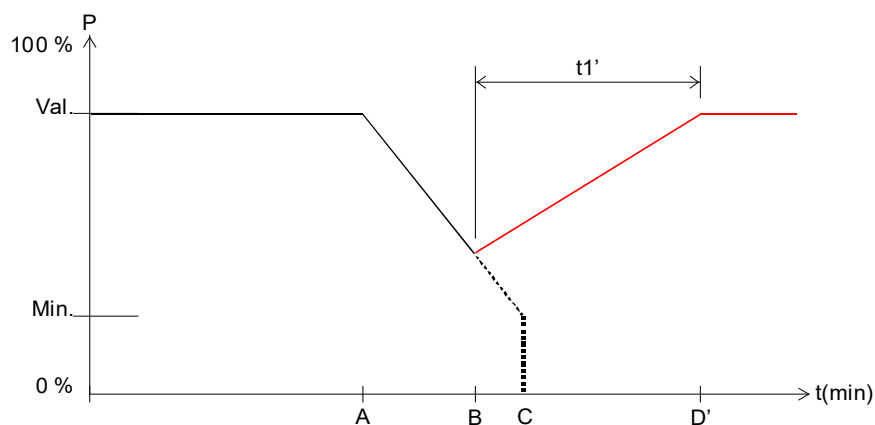
A	A Soft ON process is started
B	A Soft OFF telegram is received: The Soft ON phase is interrupted and a Soft OFF phase starts.
t_3'	Duration of the Soft OFF phase = configured Soft OFF time
D'	End of the Soft OFF phase

8.2.7 Soft ON telegram during a Soft OFF process

The duration of the Soft ON phase ($t1'$) is always equivalent to the configured time regardless of the current dimming value.



Example 3: Soft ON at the start of the Soft OFF phase.



Example 4: Soft ON at the end of the Soft OFF phase.

Sequence:

A	A Soft OFF process is started
B	A Soft OFF telegram is received: The Soft OFF phase is interrupted and a Soft ON phase starts.
t1	Duration of the Soft ON phase = configured Soft ON time
D'	End of the Soft ON phase

8.3 4-bit telegrams (brighter/darker)

8.3.1 Telegram format 4-bit (DPT 3.007) relative dimming:

Bit 3	Bits 0-1-2	
Direction	Dimming range divided into increments	
	Code	Increments
Dim up: 1	000	Stop
Dim down: 0	001	1
	010	2
	011	4
	100	8
	101	16
	110	32
	111	64 ¹⁵

Examples:

- 1111 = dim brighter by 64 increments
- 0111 = dim darker by 64 increments
- 1101 = dim brighter by 16 increments

¹⁵ typical application.

8.3.2 The parameters: *Switching on/off with a 4-bit telegram*

In general, the setting *yes* is required.

The setting *no* is available for use with special customer requests, e.g. in conference rooms.

The situation is described as follows:

A whole group of dimmer channels is operated by a push button (4-bit). A certain lighting situation has been set by a scene or other means – e.g. channel 1: off, channel 2: 40%, channel 3: 50%. The requirement is to now dim up and increase the brightness of the entire scene, but the channels in the OFF state should remain off.

The parameters *Switching on/off with a 4-bit telegram* block the usual switch on/off function of the 4-bit telegram.

Parameter <i>Switch-on with 4-bit telegram</i>	4 bit Telegram	Dimmer output status	Response
<i>yes</i>	brighter/darker	Switched on (1%...100%)	Channel is normally dimmed.
	brighter	Off	Channel is switched on and dimmed brighter
<i>no</i>	brighter	Off	Dimmer remains switched off
	brighter/darker	Switched on (1%...100%)	Channel is normally dimmed.

Parameter <i>Switching off with a 4-bit telegram</i>	4 bit Telegram	Dimmer output status	Response
<i>yes</i>	brighter/darker	Switched on (1%...100%)	Channel is normally dimmed.
	darker	On	The channel is switched off if the push button is kept depressed for longer than approx. 2 s when the minimum brightness is reached.
<i>no</i>	darker	On	Channel can be dimmed down to the minimum brightness, but is not switched off.
	brighter/darker	Switched on (1%...100%)	Channel is dimmed in range from min. to 100% and remains switched on.

8.4 Scenes

8.4.1 Principle

The current status of a channel, or of a complete device, can be stored and retrieved later at any time via the scene function.

Each channel can participate simultaneously in up to 8 scenes.
Scene numbers 1 to 64 are permitted.

Permission to participate in scenes must be granted for the relevant channel via parameter.
See Activate scenes parameter and Scenes parameter page.

The current status is allocated to the appropriate scene number when a scene is saved.

The previously saved status is restored when a scene number is called up.

This allows a device to be easily and conveniently integrated into any user scene.

The scenes are permanently stored and can be retained even after the application has been downloaded again. See *All channel scene statuses* parameter on the Scenes parameter page.

8.4.1 Calling up or saving scenes:

To call up or save a scene, the relevant code is sent to the corresponding scene object.

Scene	Call up		Save	
	Hex.	Dec.	Hex.	Dec.
1	\$00	0	\$80	128
2	\$01	1	\$81	129
3	\$02	2	\$82	130
4	\$03	3	\$83	131
5	\$04	4	\$84	132
6	\$05	5	\$85	133
7	\$06	6	\$86	134
8	\$07	7	\$87	135
9	\$08	8	\$88	136
10	\$09	9	\$89	137
11	\$0A	10	\$8A	138
12	\$0B	11	\$8B	139
13	\$0C	12	\$8C	140
14	\$0D	13	\$8D	141
15	\$0E	14	\$8E	142
16	\$0F	15	\$8F	143
17	\$10	16	\$90	144
18	\$11	17	\$91	145
19	\$12	18	\$92	146
20	\$13	19	\$93	147
21	\$14	20	\$94	148
22	\$15	21	\$95	149
23	\$16	22	\$96	150
24	\$17	23	\$97	151
25	\$18	24	\$98	152
26	\$19	25	\$99	153

Scene	Call up		Save	
	Hex.	Dec.	Hex.	Dec.
27	\$1A	26	\$9A	154
28	\$1B	27	\$9B	155
29	\$1C	28	\$9C	156
30	\$1D	29	\$9D	157
31	\$1E	30	\$9E	158
32	\$1F	31	\$9F	159
33	\$20	32	\$A0	160
34	\$21	33	\$A1	161
35	\$22	34	\$A2	162
36	\$23	35	\$A3	163
37	\$24	36	\$A4	164
38	\$25	37	\$A5	165
39	\$26	38	\$A6	166
40	\$27	39	\$A7	167
41	\$28	40	\$A8	168
42	\$29	41	\$A9	169
43	\$2A	42	\$AA	170
44	\$2B	43	\$AB	171
45	\$2C	44	\$AC	172
46	\$2D	45	\$AD	173
47	\$2E	46	\$AE	174
48	\$2F	47	\$AF	175
49	\$30	48	\$B0	176
50	\$31	49	\$B1	177
51	\$32	50	\$B2	178
52	\$33	51	\$B3	179
53	\$34	52	\$B4	180
54	\$35	53	\$B5	181
55	\$36	54	\$B6	182
56	\$37	55	\$B7	183
57	\$38	56	\$B8	184
58	\$39	57	\$B9	185
59	\$3A	58	\$BA	186
60	\$3B	59	\$BB	187
61	\$3C	60	\$BC	188
62	\$3D	61	\$BD	189
63	\$3E	62	\$BE	190
64	\$3F	63	\$BF	191

Examples (central or channel-related):

Call up status of scene 5:

→ Send \$04 to the relevant scene object.

Save current status with scene 5:

→ Send \$84 to the relevant scene object.

8.4.2 Teaching in scenes without telegrams

Instead of defining scenes individually by telegram, this can be done in advance in the ETS. This merely requires the *All channel scene statuses* parameter (*Scenes* parameter page) to be set to *Overwrite on download*.

The required status can then be selected for each of the 8 possible scene numbers of a channel (= *Status after download* parameter).

After the download, the scenes are already programmed into the device.

Later changes via teach-in telegrams are possible if required and can be permitted or blocked via a parameter.

8.5 Conversion of percentages to decimal and hexadecimal values

Percentage value	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Hexadecimal	00	1A	33	4D	66	80	99	B3	CC	E6	FF
Decimal	00	26	51	77	102	128	153	179	204	230	255

All values from 00 to FF hex. (0 to 255 dec.) are valid.