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KNX manual
1-channel flush-mounted dimming
actuators
DU 1, DU 1 RF

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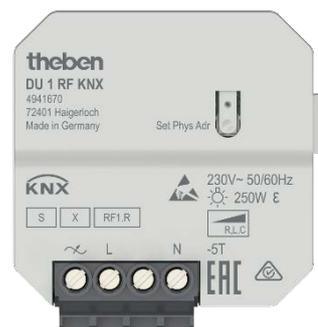
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Contents

1 ⚡ IMPORTANT WARNINGS!

⚠️ **Risk of electric shock!**

➢ The device DU 1 RF does not have basic insulation around the terminals and plug connection!

➢ The inputs carry mains voltage!

➢ When connecting the inputs or before any intervention at one of the inputs, interrupt the 230 V supply of the device.

➢ Protect against accidental contact during installation.

➢ Maintain a minimum distance of 3 mm from live parts or use additional insulation, e.g. separating strips/walls.

➢ Do not remove the insulation from the unused inputs.

➢ Do not cut off the conductors of the unused inputs.

➢ Do not connect mains voltage (230 V) or other external voltages to the inputs!

➢ During installation, ensure there is adequate insulation between mains voltage (230 V) and bus or extensions (min. 5.5 mm).

2 Application programs for DU 1

= *DU 1 V2.x secure*

= *DU 1 V1.x*

3 Function description

- 1-channel flush-mounted universal dimming actuator
- Dimming range 0-100%
- For dimming incandescent lamps, low voltage and high voltage halogen lamps, dimmable LED retrofit lamps
- Also suitable for controlling fans
- Dimming output: 250 W
- Automatic load detection (can be deactivated)
- For R, L and C-loads

ⓘ **S RF version:** optimised send/receive performance through the use of a new radio chip

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4 Operation

The device has 2 external inputs for buttons, switches, etc.

ⓘ In the initial delivery condition, i.e. prior to KNX programming, the dimming actuator can be operated directly with a button at I1.

Depending on the setting of the I1 external input 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.

ⓘ In this case, the external inputs I1 and I2 have no internal connection to the actuator.

Direct control (standard setting in the ETS)[1]
The dimming actuator channel can be operated with a conventional button.
This is connected directly to the external input I1.

ⓘ The input I1 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.

See chapter *Typical applications*.

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[1] Standard parameters button

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

5 Technical data

Operating voltage	DU 1: KNX bus voltage DU 1 RF: 230 − 240 V AC, 50 − 60 Hz
KNX bus current2	5 mA
Operating voltage	230 − 240 V AC
Frequency	50 − 60 Hz
Standby output	< 0.15 W
L x W x D	DU 1: 48,6 x 44,4 x 31,3 mm DU 1 RF: 48,6 x 46,8 x 22 mm DU 1 S RF : 48,6 x 44,4 x 25 mm
Type of installation	Flush-mounted
Connection type	DU 1: Screw terminals | bus connection: KNX bus terminal DU 1 RF: Screw terminals.
Max. cable cross-section	Solid: 0.5 mm² (Ø 0.8) to 4 mm² strand with crimp terminal: 0.5 mm² to 2.5 mm²
Number of channels	1-channel
Lamp types	Incandescent lamps, low-voltage and high-voltage halogen lamps and LEDs
Incandescent/halogen lamp load	250 W
LED lamps	Trailing edge: 200 W | leading edge: 24 W[3]
Min. switching capacity	2 W
Max. cable length	100 m
Ambient temperature	-5 °C … +45 °C
Radio standard	KNX
Transmission frequency	868,3 MHz
Transmission power	10 mW
Range in open space	Up to 100 m
Coding	FSK (Frequency Shift Keying)
Transceiver type	Bidirectional

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[2] Only DU 1.
[3] See next table

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	45 °C	RC mode	200 W
	230 V / 50 Hz	45 °C	L mode	12 W[4]
Electronic transformer	230 V / 50 Hz	25 °C	RC mode	250 W

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[4] 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.

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

5.1 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.

6 General information about KNX Secure

ETS5 Version 5.5 and higher support secure communication in KNX systems. 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 identified.

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.

6.1 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.
Also, all keys of this project can 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.

6.2 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 'Disabled'.

7 The DU 1, DU 1 RF, DU 1 (S) RF application programs

7.1 Selection in the product database

Manufacturer	Theben AG
Product family	Output
Product type	DU 1 / DU 1 RF
Program name	DU 1[5]
	DU 1 secure[6]
	DU 1 RF[7]
	DU1 (S) RF[8]

Number of communication objects	34
Number of group addresses	254
Number of associations	255

ⓘ The ETS database can be found on our website: www.theben.de/en/downloads_en

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[5] V1.0...V1.2
[6] V2.0...
[7] V1.1
[8] V2.0...

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7.2 Overview of communication objects

7.2.1 Dimmer, channel C1

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

7.2.2 External inputs: Switch/button function

No.	Object name	Function	Length	R	W	C	T	DPT
41	Channel I1.1	Switching	1 bit	R	W	C	T	1.001
		Priority	2 bits	R	-	C	T	2.001
		Send percentage value	1 byte	R	-	C	T	5.001
		Send value	1 byte	R	-	C	T	5.010
42	Channel I1.2	Switching	1 bit	R	W	C	T	1.001
		Priority	2 bits	R	-	C	T	2.001
		Send percentage value	1 byte	R	-	C	T	5.001
		Send value	1 byte	R	-	C	T	5.010
45	Channel I1	Block = 1	1 bit	-	W	C	-	1.001
		Block = 0	1 bit	-	W	C	-	1.003
51-55	Channel I2 (details: see channel I1)							

7.2.3 External inputs: Dimming function

No.	Object name	Function	Length	R	W	C	T	DPT
41	Channel I1	Switching	1 bit	R	W	C	T	1.001
42	Channel I1	Brighter / darker	4 bits	R	-	C	T	3.007
		Brighter	4 bits	R	-	C	T	3.007
		Darker	4 bits	R	-	C	T	3.007
43	Channel I1.1	Switching	1 bit	R	W	C	T	1.001
		Priority	2 bits	R	-	C	T	2.001
		Send percentage value	1 byte	R	-	C	T	5.001
		Send value	1 byte	R	-	C	T	5.010
45	Channel I1	Block = 1	1 bit	-	W	C	-	1.001
		Block = 0	1 bit	-	W	C	-	1.003
51-55	Channel I2 (details: see channel I1)							

7.2.4 External inputs: Blinds function

No.	Object name	Function	Length	R	W	C	T	DPT
41	*Channel I1*	*Step / stop*	1 bit	R	–	C	T	1.010
42	*Channel I1*	*UP / DOWN*	1 bit	R	W	C	T	1.008
		UP	1 bit	R	–	C	T	1.008
		DOWN	1 bit	R	–	C	T	1.008
43	*Channel I1.1*	*Switching*	1 bit	R	W	C	T	1.001
		Priority	2 bits	R	–	C	T	2.001
		Send percentage value	1 byte	R	–	C	T	5.001
		Height % [9]	1 byte	R	–	C	T	5.001
		Send value	1 byte	R	–	C	T	5.010
		2-byte 9.x	2 bytes	R	–	C	T	9.xxx
		4-byte 14.x	4 bytes	R	–	C	T	14.xxx
44	*Channel I1.2*	*Slat %* [10]	1 byte	R	–	C	T	5.001
45	*Channel I1*	*Block = 1*	1 bit	–	W	C	–	1.001
		Block = 0	1 bit	–	W	C	–	1.003
51-55	Channel I2 (details: see channel I1)							

7.2.5 External inputs: Temperature input function (I2 only)

No.	Object name	Function	Length	R	W	C	T	DPT
51	*Channel I2*	*Actual value for temperature*	2 bytes	R	–	C	T	9.001

7.2.6 Common objects

No.	Object name	Function	Length	R	W	C	T	DPT
71	*Central*	*Central permanent ON*	1 bit	–	W	C	–	1.001
72	*Central*	*Central permanent OFF*	1 bit	–	W	C	–	1.001
73	*Central*	*Central switching*	1 bit	–	W	C	–	1.001
74	*Central*	*Call up/save central scenes*	1 byte	–	W	C	–	18.001
75	Firmware version	Send	2 bytes	R	–	C	T	217.001

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[9] Upon double-click with object type = *height % + slat %*
[10] Upon double-click with object type = *height % + slat %*

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

7.3 Description of communication objects

7.3.1 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 4-bit telegrams (DPT 3,007 Control Dimming).
This function can be used to dim the light up or down
in increments.
In the standard application, telegrams are sent with 64 increments.
IMPORTANT: The response to 4-bit telegrams depends on the
Switching On/Off with a 4-bit telegram parameter *from*.
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 = 0%
255 = 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 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: Use of the soft switch function

Object 5: Block
Responses to the block being set and cancelled can be configured if the block function has been
activated (**Configuration options Channel C1** 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 reaction*, a running soft-switch process
will not be interrupted.

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Object 6: Call up/save scenes

Only available if the scene function has been activated (**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-bit, 2-bit or 1-byte object.

Format of force object	*Force*		*Response with force*	
	trigger with	end with	*Start*	*End*
1 bit	1 or 0 (configurable)	0 or 1 (configurable)	configurable in the application program	
2 bits	Force On = 3 Force Off = 2	Deactivate force = 0 or 1	configurable in the application program.	The last dimming value before force is restored
1 byte	1-100%	0	The triggering telegram also acts simultaneously as a force dimming value	The last dimming value before force is restored

Object 9: Dimming value limit

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%

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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 message

Used as a malfunction signal:
0 = no error
1 = an error has been detected

This message can, for example, be displayed in 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 overloaded:
·   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.

7.3.2 Objects for the external inputs: Switch function

Object 41: Channel I1.1
First output object of the channel (first telegram).
4 telegram formats can be set:
Switching ON/OFF, priority, send percentage value, send value.

Object 42: Channel I1.2
Second output object of the channel (second telegram).
4 telegram formats can be set:
Switching ON/OFF, priority, send percentage value, send value.

Object 45: Channel I1 block = 1, or block = 0
The channel is blocked via this object.
The acting direction of the block object and behaviour when the block is set or cancelled can be configured.

Objects 51–55
Objects for channel I2

7.3.3 Objects for the external inputs: Button function

Object 41: Channel I1.1
First output object of the channel (first telegram).
4 telegram formats can be set:
Switching ON/OFF, priority, send percentage value, send value.

Object 42: Channel I1.2
Second output object of the channel (second telegram).
4 telegram formats can be set:
Switching ON/OFF, priority, send percentage value, send value.

Object 45: Channel I1 block = 1, or block = 0
The channel is blocked via this object.
The acting direction of the block object and behaviour when the block is set or cancelled can be configured.

Objects 51–55
Objects for channel I2

7.3.4   Objects for the external inputs: Dimming function

Object 41: Channel I1.1 switching
Switches the dimmer on and off.

Object 42: Channel I1.1 lighter, darker, lighter / darker
4-bit dimming commands.

Object 43: Channel I1.1 switching, priority, percentage.
Output object for the additional function upon double-click.
4 telegram formats can be set:
Switching ON / OFF, priority, send percentage value, send value.

Object 45: Channel I1 block = 1, or block = 0
The channel is blocked via this object.
The acting direction of the block object and behaviour when the block is set or cancelled can be configured.

Objects 51–55
Objects for channel I2

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7.3.5 Objects for the external inputs: Blinds function

Object 41: Channel I1 step / stop
Sends step/stop commands to the blind actuator.

Object 42: Channel I1 UP/DOWN, UP, DOWN
Sends operating commands to the blind actuator.

Object 43: Channel I1.1 switching, priority, percentage, height %
Output object for the additional function upon double-click.
5 telegram formats can be set:
Switching ON/OFF, priority, send percentage value, send value, height %.

Object 44: Channel I1.1 slat %
Slat telegram for positioning the blinds upon double-click (together with object
height %, with *object type = height + slat*).

Object 45: Channel I1 block = 1, or block = 0
The channel is blocked via this object.
The acting direction of the block object and behaviour when the block is set or cancelled can be configured.

Objects 51–55
Objects for channel I2

7.3.6 Objects for the external inputs: Temperature input function

Object 51: Channel I2 actual value for temperature[11]
Sends the temperature measured at input I2 (remote sensor or floor temperature sensor).

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[11] The temperature input function is only possible with input I2.

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

7.3.7 Common objects

Object 71: Central permanent ON
Central switch-on function.
0 = no function
1 = permanent ON

Participation in this object can be configured
(**Configuration options** parameter page).

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

Object 72: Central permanent OFF
Central switch-off function.
0 = no function
1 = permanent OFF

Participation in this object can be configured
(**Configuration options** parameter page).

ⓘ 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 73: Central switching
Central switch function.

0 = OFF
1 = ON
Participation in this object can be configured
(**Configuration options** parameter page).
With this object, the participating channel responds exactly as if its input object
were receiving a switch command.

Object 74: 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*

7.4 Parameter pages overview

7.4.1 General

Parameter page	Description
General	Activate binary inputs.

7.4.2 Dimming actuator

Parameter page	Description
Channel C1	
Configuration options	Characteristics of channel and activation of additional functions (soft switching, force, scenes, etc.).
Dimming response	Load selection, dimming times, dimming switch-on value, etc.
Dimming value limits	Scope of the limit.
Soft switching	Brightness/dimming value and time settings for soft switching.
Block function	Type of block telegram and response to blocking.
Feedback	Format of the feedback objects and cyclical transmission time.
Force	Response in forced operation.
Scenarios	Selection of scene numbers relevant to the channel.
Hour counter and service	Type of hour counter and, if applicable, service interval, etc.
Diagnostic messages	Activate transmission of the diagnostic and error messages.
Power failure and restoration	Behaviour during failure and restoration of bus and mains power.

7.4.3 External inputs

Parameter page	Description
Input I1, I2	
Configuration options	Function of the input, debounce time, number of telegrams, block function, etc. Additionally in the case of I2: Selection of the temperature sensor, temperature calibration, etc.
Switch object 1, 2	Object type, transmission behaviour, etc. can be set for each object individually.
Direct switching	Switching statuses in the case of direct control
Button object 1, 2	Object type, transmission behaviour, etc. can be set for each object individually.
Dimming	Type of control.
Blinds	Type of control.
Double-click	Additional telegrams for Dimming and Blinds.
Window contact[12]	Direction of action, cycl. transmission, etc.

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[12] Only for blinds actuator.

7.5 General parameters

7.5.1 General

Designation	Values	Description
Use binary inputs	*No*	The external inputs have no function.
	Yes	2 external inputs I1, I2 can be used as KNX binary inputs, or I1 can be used for direct control of dimming channel C1.

7.6 Parameters for the dimming actuator

7.6.1 Channel C1: Configuration options

Designation	Values	Description
Adjust dimming value limits	**no**	The standard values apply: *Implement limit when executing the object = no* *Limit applies for:* *- Soft switching,* *- absolute dimming* *- relative dimming* *- switch command = no*
	yes..	The page **Dimming value limits** will be shown and all parameters can be adjusted individually.
Adjust soft switching	**no**	The standard values apply: *- Time for Soft ON = 1 min* *- Dimming value after Soft ON = 100%* *- Time between Soft ON and Soft OFF = 5 min* *- Time for Soft OFF = 1 min*
	yes..	The page **Soft switching** will be shown and all parameters can be adjusted individually.
Adjust block function	**no**	The standard values apply: *- Block with 1 (standard)* *- Response when the block is set = 10%* *- Behaviour when cancelling the block = update*

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Designation	Values	Description
	yes..	The page **Block function** will be shown and all parameters can be adjusted individually.
Participation in central objects	*no*	Central objects are not taken into account.
	yes: in all central objects *only in central permanent ON* *only in central permanent OFF* *only in central switching* *only in central switching and permanent ON* *only in central switching and permanent OFF* *only in central permanent ON and permanent OFF*	Which central objects are to be taken into account? Central objects enable simultaneous switching on and off of several channels with one single object.
Adjust feedback	*no*	The standard values apply: *- Format of 1-bit feedback = not inverted* *- Send 1-bit feedback cyclically = no* *- Send 8-bit feedback = only after ending the dimming process.* *- Send 8-bit feedback cyclically = no* *- Time for cyclical transmission of feedback* *= 60 min*
	yes..	The page **Feedback** will be shown, and all parameters can be adjusted individually.
Activate force function	*no*	No force function.
	yes..	The page **Force function** will be shown.
Activate scenes	*no*	Do not use scenes.
	yes..	The page **Scenes** will be shown
Activate hour counter	*no*	No hour counter.
	yes..	The page **Hour counter** will be shown.

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

Designation	Values	Description
Activate diagnostic messages	**no**	no diagnostic messages
	yes..	The page **Diagnostic messages** will be shown.

7.6.2　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).
	RC load (LED/incandescent lamps, electron. transformers)	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.
	L-load (wound transformers)	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.
	Fan (soft switching deactivated)	Special mode for fans, with configurable start-up time (see below).
	LEDs (RC, 0-90%)	Only for LED lamps that cannot be dimmed down at 100% (trailing edge control).
	Reserve 2 ... Reserve 32	Do not use.
Start-up time	2-60 s Default = **10 s**	Only with *Load selection = fan*. Time for which the fan must be controlled with full voltage, until it has reached a specific speed.
Minimum dimming value	1%, 5%, **10%**, 15%, 20%, 25%, 30% 35%, 40%, 45%, 50%	Minimum dimming value for all dimming processes (except 0%). Any values (*switch-on dimming value, response to bus failure*, etc.) which are below this threshold are increased to the *minimum dimming value*.

Designation	Values	Description
Dimming time 1 from 0% to 100%	*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).
Dimming time 2 from 0% to 100%	*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.
Dimming time 3 from 0% to 100%	*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.
When receiving a switch command (1-bit)	*immediate on* ***soft on with dimming time 1** soft on with dimming time 2 soft on with dimming time 3*	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.
When receiving a dimming command (4-bit)	*immediate on* ***soft on with dimming time 1** soft on with dimming time 2 soft on with dimming time 3*	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). The change from 0% to 100% or 100% to 0% takes place within the preset dimming time in correspondingly lower increments.
When receiving an absolute value (8-bit)	*immediate on* ***soft on with dimming time 1** soft on with dimming time 2 soft on with dimming time 3*	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) etc.
Switch-on value	***Value before previous switch-off*** *minimum value* *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 adopts the selected value after it is switched on. Here again the configured *minimum dimming value* needs to be taken into account.

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Designation	Values	Description
Switch-on with 4-bit dim telegr.		Defines the response if the channel is switched off and a 4-bit telegram (brighter) is received. See appendix: 4-bit telegrams (brighter/darker).
	no	Channel status remains unchanged.
	yes	Channel is switched on and dimmed.
Switching off with a 4-bit dim telegr.		Defines the response if the channel is switched on and a 4-bit telegram (darker) is received. See appendix: 4-bit telegrams (brighter/darker).
	no	Channel status remains unchanged.
	yes	Channel is switched off.

7.6.3 Dimming value limits

ⓘ The dimming value can be temporarily restricted via object *Brightness restriction*. 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
Perform limit in describing object	**no**	Limit not applied until next dimming process.
	yes	Limit the dimming value as soon as a value is received on the *dimming value limit* object.
Limit applies to switch command (1-bit)	**no**	No limit during switch commands.
	yes	Limit is effective.
Limit applies to relative dimming (4-bit)	**no**	No limit during brighter/darker commands.
	yes	Limit is effective.
Limit applies to absolute dimming (8-bit)	**no**	No limit for percentage value telegrams.
	yes	Limit is effective.
Limit applies to soft switching	**no**	No limit for soft switching
	yes	Limit is effective.

7.6.4 Soft switching

Designation	Values	Description
Time for Soft ON	*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 (see appendix). 0 s = switch on immediately. ⓘ See appendix for further details: *Retriggering and premature switch off*.
Dimming value after Soft ON	*10%, 20%, 30%* *40%, 50%, 60%,* *70%, 80%, 90%,* **100%**	Final value at the end of the soft on phase (val) Comment: Here again the configured *minimum dimming value* needs to be taken into account.
Time between Soft ON and Soft OFF	*until Soft OFF telegram* *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
Time for Soft OFF	*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: *Retriggering and premature switch off*.

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7.6.5 Block function

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

7.6.6 Feedback

Designation	Values	Description
Format of 1-bit feedback	**not inverted**	Standard setting: 1-100% = 1 0% = 0
	inverted	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**	Only send current dimming value when the new dimming value has been reached.
	every 10% *every 20%* *every 30%*	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)

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7.6.7 Force

Designation	Values	Description
Format of force object		Force is triggered by:
	1 bit	Switch telegram.
	2 bits	Priority telegram.
	1 byte (%)	Dimming value.
1 bit		
Activate force function with	*1*	Recommended.
	0	After reset/download, forced operation is already activated and must be cancelled if necessary.
Behaviour at start of force	**no change** *minimum dimming value* *100%* *OFF* *10%, 20%, 30% 40%, 50%, 60% 70%, 80%, 90%*	Response to the receipt of a force telegram. Here again the configured *minimum dimming value* needs to be taken into account.
Behaviour at end of force	*update[13]* ***Value before force*** *minimum dimming value* *100%* *OFF* *10%, 20%, 30% 40%, 50%, 60% 70%, 80%, 90%*	Response to cancellation of force. Here again the configured *minimum dimming value* needs to be taken into account.
2 bits		
Behaviour at force ON	*no change* *minimum dimming value* ***100%*** *OFF* *10%, 20%, 30% 40%, 50%, 60% 70%, 80%, 90%*	Response to the receipt of a force telegram. Here again the configured *minimum dimming value* needs to be taken into account.
Behaviour at force OFF	***OFF***	-
Behaviour at end of force	*update[14]*	Response to cancellation of force.

[13] 4-bit commands received during the force (brighter/darker) will not be considered. Soft ON and Soft OFF processes will be aborted.
[14] 4-bit commands received during the force (brighter/darker) will not be considered. Soft ON and Soft OFF processes will be aborted.

Designation	Values	Description
	Value before force *minimum dimming value* *100%* *OFF* *10%, 20%, 30%* *40%, 50%, 60%* *70%, 80%, 90%*	Here again the configured *minimum dimming value* needs to be taken into account.
1 byte (%)		
Behaviour at end of force	*update*[15] *Value before force* *minimum dimming value* *100%* *OFF* *10%, 20%, 30%* *40%, 50%, 60%* *70%, 80%, 90%*	Response to cancellation of force. Here again the configured *minimum dimming value* needs to be taken into account.

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[15] 4-bit commands received during the force (brighter/darker) will not be considered.
Soft ON and Soft OFF processes will be aborted.

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7.6.8 Scenes

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

Designation	Values	Description
Block telegram for scenes	**Block with 1 (standard)**	0 = cancel block 1 = block
	Block with 0	0 = block 1 = cancel block Note: With this setting, the scenes are always blocked immediately after reset or download.
All channel scene statuses	**Overwrite on download**	A download deletes all scene memories in a channel, i.e. all previously taught-in scenes. When a scene number is called, the channel assumes the configured assigned dimming value (see below). See appendix: Entering scenes without telegrams
	Unchanged after download	All previously taught-in scenes are saved. However, the scene numbers to which the channel should react can be changed (see below: Channel reacts to).
Participation in central scene object	**No** *yes*	Should the device react to the central scene object?
Channel reacts to	*No scene number* **Scene number 1** *Scene number 63*	First of the 8 possible scene numbers to which the channel is to react.
Assigned dimming value	*Off* **10%**, *20%, 30%* *40%, 50%, 60%,* *70%, 80%, 90%,* *100%*	New dimming value to be assigned to the selected scene number. Only possible if the scene statuses are to be overwritten after download.
Permit teach-in	*No* **Yes**	Scenes can only be called up. The user can both call up and teach in or amend scenes.
Channel reacts to	*No scene number* *Scene number 1* **Scene number 2** *...* *Scene number 63*	Second of the 8 possible scene numbers

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Designation	Values	Description
Assigned dimming value	*Off* *10%, **20%**, 30%* *40%, 50%, 60%,* *70%, 80%, 90%,* *100%*	See above.
Permit teach-in	*No* ***Yes***	See above.
Channel reacts to	*No scene number* *Scene number 1* *…* ***Scene number 3*** *…* *Scene number 63*	Third of the 8 possible scene numbers
Assigned dimming value	*Off* *10%, 20%, **30%*** *40%, 50%, 60%,* *70%, 80%, 90%,* *100%*	See above.
Permit teach-in	*No* ***Yes***	See above.
Channel reacts to	*No scene number* *Scene number 1* *…* ***Scene number 4*** *…* *Scene number 63*	Fourth of the 8 possible scene numbers
Assigned dimming value	*Off* *10%, 20%, 30%* ***40%**, 50%, 60%,* *70%, 80%, 90%,* *100%*	See above.
Permit teach-in	*No* ***Yes***	See above.
Channel reacts to	*No scene number* *Scene number 1* *…* ***Scene number 5*** *…* *Scene number 63*	Fifth of the 8 possible scene numbers
Assigned dimming value	*Off* *10%, 20%, 30%* *40%, **50%**, 60%,* *70%, 80%, 90%,* *100%*	See above.
Permit teach-in	*No* ***Yes***	See above.

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Designation	Values	Description
Channel reacts to	No scene number Scene number 1 ... **Scene number 6** ... Scene number 63	Sixth of the 8 possible scene numbers
Assigned dimming value	Off 10%, 20%, 30% 40%, 50%, **60%**, 70%, 80%, 90%, 100%	See above.
Permit teach-in	No **Yes**	See above.
Channel reacts to	No scene number Scene number 1 ... **Scene number 7** ... Scene number 63	Seventh of the 8 possible scene numbers
Assigned dimming value	Off 10%, 20%, 30% 40%, 50%, 60%, **70%**, 80%, 90%, 100%	See above.
Permit teach-in	No **Yes**	See above.
Channel reacts to	No scene number Scene number 1 ... **Scene number 8** ... Scene number 63	Last of the 8 possible scene numbers
Assigned dimming value	Off 10%, 20%, 30% 40%, 50%, 60%, 70%, **80%**, 90%, 100%	See above.
Permit teach-in	No **Yes**	See above.

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7.6.9 Hour counter and service

Designation	Values	Description
Type of hour counter	***Hour counter***	Forward counter for channel duty cycle.
	Counter for time to next service	Backward counter for channel duty cycle.
Hour counter		
Reporting of operating hours in the event of a change (0..100 h, 0 = no report)	*0..100* *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.
Report operating hours cyclically	**No** *yes*	Send at regular intervals?
Time for cyclical transmission	*2 minutes, 3 minutes, 5 minutes, 10 minutes, 15 minutes, 20 minutes, 30 minutes, 45 minutes* **60 minutes**	At what interval?
Counter for time to next service		
Service interval (x10 h)	*0..2000* *Default value = 100*	**Desired timescale between 2 services.** Example: **10 = 10 x 10 h = 100 hours**
Reporting of time to service in the event of a change (0 = no report)	*0..100* *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.
Report time to service cyclically	*no* *Yes*	Send remaining time to next service at regular intervals? → Object Time to next service.
Report service cyclically	*no* *Yes*	Send expiry of time to next service at regular intervals? → Object Service required.
Time for cyclical transmission (if used)	*2 minutes, 3 minutes, 5 minutes, 10 minutes, 15 minutes, 20 minutes, 30 minutes, 45 minutes 60 minutes*	At what interval?

7.6.10 Diagnostic messages

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

7.6.11 Power failure and restoration

Designation	Values	Description
Dimming value during download and bus failure[16]	***same as before failure***	Restore status before download or maintain status before bus failure.
	100%, 0%, *10%, 20%, 30%* *40%, 50%, 60%* *70%, 80%, 90%*	Apply set value here. Here again the configured minimum dimming value needs to be taken into account.
Dimming value during restoration of the mains supply or bus supply[17]	***same as before failure***	Restore status before failure
	100%, 0%, *10%, 20%, 30%* *40%, 50%, 60%* *70%, 80%, 90%*	Apply set value here. Here again the configured minimum dimming value needs to be taken into account.

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[16] Only DU 1
[17] Only DU 1

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7.7 Parameters for the external inputs I1, I2 purely as KNX binary inputs

ⓘ If direct control is not required, inputs I1 and I2 are available as KNX binary inputs.

ⓘ The parameter *Control channel C1 directly* must be set to *no* for this purpose.

7.7.1 Input I1, I2: Switch function

Designation	Values	Description
Function	***Switch..*** *Button..* *Dimming..* *Blinds..*	Desired use.
Control channel C1 directly	*No*	I1 is used purely as a KNX binary input. There is no internal connection to the switch actuator.
Debounce time	*30 ms, 50 ms, 80 ms* *100 ms, 200 ms,* *1 s, 5 s, 10 s*	In order to avoid disruptive switching due to bouncing of the contact connected to the input, the new status of the input is only accepted after a delay time. Larger values (≥ 1 s) can be used as a switch-on delay
Activate block function	*no* *yes*	No block function. Show parameters for the block function.
Block telegram	***Block with 1 (standard)*** *Block with 0*	0 = cancel block 1 = block 0 = block 1 = cancel block
Send cyclically	*every min* *every 2 min* *every 3 min* *...* ***every 30 min*** *every 45 min* *every 60 min*	Common cycle time for all 3 output objects of the channel.
Number of telegrams	***one telegram*** *two telegrams*	Each channel has 2 output objects and can thus send up to 2 different telegrams.

7.7.1.1   Switch objects 1, 2

Each of the 2 objects can be configured individually on its own parameter page.

Designation	Values	Description	
Object type	**Switching (1 bit)** *Priority (2 bit)* *Value 0-255* *Percentage value (1 byte)*	Telegram type for this object.	
Send if *input = 1*	*no* **yes**	Send if voltage is present at the input?	
Telegram	*With object type = switching 1 bit*		
	ON *OFF* *INVERT*	Send switch-on command Send switch-off command Invert current state (ON-OFF-ON etc.)	
	With object type = priority 2 bit		
		Function	Value
	inactive	Priority inactive (no control)	0 (00_{bin})
	ON	Priority ON (control: enable, on)	3 (11_{bin})
	OFF	Priority OFF (control: disable, off)	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 if *input = 0*	*no* **yes**	Send if no voltage is present at the input?	
Telegram	See above: Same object type as *Send if input = 1*		
Send cyclically	**no** *yes, always* *only if input = 1* *only if input = 0*	When should cyclical sending take place? The cycle time is set on the main parameter page of the channel.	
Response after restoration of the bus supply[18]	**none** *update (immediately)* *update (after 5 s)* *update (after 10 s)* *update (after 15 s)*	Do not send. Send update telegram immediately or with delay.	
Response when the block is set	**Ignore block** *no response*	The block function is ineffective with this telegram. Do not respond when the block is set.	

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[18] DU 1 RF: Response after download or mains restoration

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Designation	Values	Description
	as with input = 1	Respond as with rising edge.
	as with input = 0	Respond as with falling edge.
Response when the block is cancelled	**no response**	Do not respond when the block is cancelled.
	update	Send update telegram.

ⓘ If a channel is blocked, no telegrams will be sent cyclically.

7.7.2 Input I1, I2: Button function

Designation	Values	Description
Function	**Switch..** *Button..* *Dimming..* *Blinds..* *Window contact..*	Desired use.
Control channel C1 directly	*No*	I1 is used purely as a KNX binary input. There is no internal connection to the switch actuator.
Debounce time	*30 ms, 50 ms, 80 ms* *100 ms, 200 ms,* *1 s, 5 s, 10 s*	In order to avoid disruptive switching due to bouncing of the contact connected to the input, the new status of the input is only accepted after a delay time. Larger values ($\geq$ 1 s) can be used as a switch-on delay
Connected button	**NO contact** *NC contact*	Set the type of connected contact.
Long button push starting at	**300 ms,** *400 ms* *500 ms, 600 ms* *700 ms, 800 ms* *900 ms, 1 s*	Serves to clearly 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.
Time for double-click	**300 ms,** *400 ms* *500 ms, 600 ms* *700 ms, 800 ms* *900 ms, 1 s*	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.
Send cyclically	*every min* *every 2 min* *every 3 min* *…* **every 30 min** *every 45 min* *every 60 min*	Common cycle time for all 2 output objects of the channel.
Number of telegrams	**one telegram** *two telegrams*	Each channel has 2 output objects and can thus send up to 2 different telegrams.
Activate block function	*no* *yes*	No block function. Show parameters for the block function.
Block telegram	**Block with 1 (standard)** *Block with 0*	0 = cancel block 1 = block 0 = block 1 = cancel block

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7.7.2.1 Button objects 1, 2

Designation	Values	Description	
Object type	**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*		
	ON *OFF* *INVERT*	Send switch-on command Send switch-off command Invert current state (ON-OFF-ON etc.)	
	With object type = priority 2 bit		
		Function	Value
	inactive	Priority inactive (no control)	0 (00$_{bin}$)
	ON	Priority ON (control: enable, on)	3 (11$_{bin}$)
	OFF	Priority OFF (control: disable, off)	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.		
Send cyclically	**no** *yes*	The cycle time is set on the main parameter page of the channel.	
Response after restoration of the bus	**none**	Do not send.	

Designation	Values	Description
supply[19]	As with short (immediately) As with short (after 5 s) As with short (after 10 s) As with short (after 15 s) As with long (immediately) As with long (after 5 s) As with long (after 10 s) As with long (after 15 s) As with double-click (immediately) As with double-click (after 5 s) As with double-click (after 10 s) As with double-click (after 15 s)	Send update telegram immediately or with delay. The value to be sent depends on the value configured for long button push, short button push or double-click.
Response when the block is set	**Ignore block**	The block function is ineffective with this telegram.
	no response	Do not respond when the block is set.
	as with short	Respond as with a short button push.
	as with long	Respond as with a long button push.
	as with double-click	Respond as with a double-click.
Response when the block is cancelled	**no response**	Do not respond when the block is cancelled.
	as with short	Respond as with a short button push.
	as with long	Respond as with a long button push.
	as with double-click	Respond as with a double-click.

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[19] DU 1 RF: Response after download or mains restoration

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7.7.3   Input I1, I2: Dimming function

(i)   If direct control is not required, inputs I1 and I2 are available as KNX binary inputs.

(i)   The parameter *Control channel C1 directly* must be set to *no* for this purpose.

Designation	Values	Description
Channel function	*Switch..* *Button..* **Dimming..** [20] *Blinds..* *Window contact..*	The input controls a dimming actuator,
Control channel C1 directly	**yes**	I1 is used exclusively as an input for dimming actuator channel C1. I1 is connected to C1 internally and has no communication objects.
	No	I1 is used purely as a KNX binary input. There is no internal connection to the switch actuator.
Debounce time	*30 ms, 50 ms, 80 ms* *100 ms, 200 ms,* *1 s, 5 s, 10 s*	In order to avoid disruptive switching due to bouncing of the contact connected to the input, the new status of the input is only accepted after a delay time. Larger values (≥ 1 s) can be used as a switch-on delay
Activate block function	**no**	No block function.
	yes	Show **block function** parameter page.
Block telegram	**Block with 1 (standard)**	0 = cancel block 1 = block
	Block with 0	0 = block 1 = cancel block
Long button push starting at	**300 ms**, *400 ms* *500 ms, 600 ms* *700 ms, 800 ms* *900 ms, 1 s*	Serves to clearly 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.
Double-click additional function	**no**	No double-click function
	yes	The **double-click** parameter page is shown.

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[20] Direct control of C1 possible.

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Designation	Values	Description
Time for double-click	**300 ms**, *400 ms* *500 ms, 600 ms* *700 ms, 800 ms* *900 ms, 1 s*	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.

7.7.3.1 Double-click parameter page

Designation	Values	Description
Object type	**Switching (1 bit)** *Priority (2 bit)* *Value 0-255* *Percentage value (1 byte)*	Telegram type for this object.
Telegram	*With object type = switching 1 bit*	

	ON OFF INVERT	Send switch-on command Send switch-off command Invert current state (ON-OFF-ON etc.)

	With object type = priority 2 bit		

		Function	Value
	inactive	Priority inactive (no control)	0 (00_{bin})
	ON	Priority ON (control: enable, on)	3 (11_{bin})
	OFF	Priority OFF (control: disable, off)	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.

Designation	Values	Description
Send cyclically	**do not send cyclically** *every min* *every 2 min* *every 3 min* … *every 45 min* *every 60 min*	How often should it be resent?
Response after restoration of the bus supply[21]	**none** *As with double-click (immediately)* *As with double-click (after 5 s)* *As with double-click (after 10 s)* *As with double-click (after 15 s)*	Do not send. Send update telegram immediately or with delay. The value to be sent depends on the value configured for double-click.
Response when the block is set	**Ignore block** *no response* *as with double-click*	The block function is ineffective with this telegram. Do not respond when the block is set. Respond as with a double-click.

---

[21] DU 1 RF: Response after download or mains restoration

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

Designation	Values	Description
Response when the block is cancelled	**no response**	Do not respond when the block is cancelled.
	as with double-click	Respond as with a double-click.

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

7.7.3.2 Dimming parameter page

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 button. Short button push = ON/OFF Long button push = brighter/darker release = stop With the other variants, the dimmer is operated using 2 buttons (rocker).
	brighter / ON	Short button push = ON Long button push = brighter Release = stop
	brighter / INVERT	Short button push = ON / OFF Long button push = brighter Release = stop
	darker / OFF	Short button push = OFF Long button push = darker Release = stop
	darker / INVERT	Short button push = ON / OFF Long button push = darker Release = stop
Increment for dimming		With a long button push, the dimming value is:
	100%	Increased (or decreased) until the button is released.
	50% 25% 12.5% 6% 3% 1.5%	Increased by the selected value (or reduced)
Response after restoration of the mains or bus supply[22]	*none*	Do not respond.

---

[22] DU 1 RF: Response after download or mains restoration

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

Designation	Values	Description
	ON	Switch on dimmer
	OFF	Switch off dimmer
	ON after 5 s ON after 10 s ON after 15 s	Switch on dimmer with delay
	OFF after 5 s OFF after 10 s OFF after 15 s	Switch off dimmer with delay
Response when the block is set	**Ignore block**	The block function is ineffective with this telegram.
	no response	Do not respond when the block is set.
	ON	Switch on dimmer
	OFF	Switch off dimmer
Response when the block is cancelled	**no response**	Do not respond when the block is cancelled.
	ON	Switch on dimmer
	OFF	Switch off dimmer

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

7.7.4 Input I1, I2: Blinds function

Designation	Values	Description
Activate channel	*no* *yes*	Use input?
Channel function	*Switch..* *Button..* *Dimming..* **Blinds..** *Window contact..*	The input controls a blind actuator.
Control channel C1 directly	*No*	I1 is used purely as a KNX binary input. There is no internal connection to the switch actuator.
Debounce time	*30 ms, 50 ms, 80 ms* *100 ms, 200 ms,* *1 s, 5 s, 10 s*	In order to avoid disruptive switching due to bouncing of the contact connected to the input, the new status of the input is only accepted after a delay time. Larger values (≥ 1 s) can be used as a switch-on delay.
Activate block function	*no* *yes*	No block function. Show **block function** parameter page.
Block telegram	**Block with 1 (standard)** *Block with 0*	0 = cancel block 1 = block 0 = block 1 = cancel block
Long button push starting at	**300 ms**, *400 ms* *500 ms, 600 ms* *700 ms, 800 ms* *900 ms, 1 s*	Serves to clearly 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.
Double-click additional function	no *yes*	No double-click function The **double-click** parameter page is shown.
Time for double-click	**300 ms**, *400 ms* *500 ms, 600 ms* *700 ms, 800 ms* *900 ms, 1 s*	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.

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

7.7.4.1 Double-click parameter page

Designation	Values	Description
Object type	**Switching (1 bit)** *Priority (2 bit)* *Value 0-255* *Percentage value (1 byte)* *Height % + slat %*	Telegram type for this object.
Telegram	*With object type = switching 1 bit*	
	ON OFF INVERT	Send switch-on command Send switch-off command Invert current state (ON-OFF-ON etc.)
	With object type = priority 2 bit	

		Function	Value
	inactive	Priority inactive (no control)	0 (00bin)
	ON	Priority ON (control: enable, on)	3 (11bin)
	OFF	Priority OFF (control: disable, off)	2 (10bin)

Designation	Values	Description
	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.
	With object type = height % *+ slat %*	
	Height	Upon double-click 2 telegrams are sent simultaneously: Required blind height
	Slat	Required slat position.
Send cyclically	**do not send cyclically** *every min* *every 2 min* *every 3 min* *…* *every 45 min* *every 60 min*	How often should it be resent?
Response after restoration of the bus supply[23]	**none** *As with double-click (immediately)* *As with double-click (after 5 s)* *As with double-click (after 10 s)* *As with double-click (after 15 s)*	Do not send. Send update telegram immediately or with delay. The value to be sent depends on the value configured for double-click.

---

[23] DU 1 RF: Response after download or mains restoration

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

Designation	Values	Description
Response when the block is set	***Ignore block***	The block function is ineffective with this telegram.
	no response	Do not respond when the block is set.
	as with double-click	Respond as with a double-click.
Response when the block is cancelled	**no response**	Do not respond when the block is cancelled.
	as with double-click	Respond as with a double-click.

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

7.7.4.2 Blinds parameter page

Designation	Values	Description
Operation		The input distinguishes between a long and a short button push, and can thus carry out 2 functions.
	One button operation	The blinds are operated with a single button. Short button push = step. Long button push = move.
	DOWN	Short button push = step. Long button push = lower.
	UP	Short button push = step. Long button push = raise.
Movement is stopped by	*Releasing the button* ***Short operation***	How is the stop command to be triggered?
Response after restoration of the bus supply[24]	***none***	Do not respond.
	UP	Raise blinds
	DOWN	Lower blinds
	UP after 5 s *UP after 10 s* *UP after 15 s*	Raise blinds with delay
	DOWN after 5 s *DOWN after 10 s* *DOWN after 15 s*	Lower blinds with delay
Response when the block is set	***Ignore block***	The block function is ineffective with this telegram.
	no response	Do not respond when the block is set.
	UP	Raise blinds
	DOWN	Lower blinds
Response when the block is cancelled	***no response***	Do not respond when the block is cancelled.
	ON	Raise blinds
	OFF	Lower blinds

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[24] DU 1 RF: Response after download or mains restoration

7.7.5   Input I2: Temperature input function[25]

Designation	Values	Description
Channel function	*Switch..* *Button..* *Dimming..* *Blinds..* **Temperature input[26]**	The input is connected to a temperature sensor.
Sensor type	**Remote sensor 1 (9070191)**	External temperature sensor 1 Item no. 9070191, for surface-mounted installation.
	Remote sensor IP 65 (9070459)	External temperature sensor RAMSES IP65 Item no. 9070459, for surface-mounted installation.
	Floor sensor (9070321)	Temperature sensor for laying in floor, IP65 protection rating.
Temperature calibration	*-64..+64* *(x 0.1 K)*	Correction value for temperature measurement if sent temperature deviates from the actual ambient temperature. **Example:** Temperature = 20°C sent temperature = 21°C Correction value = 10 (d.h. 10 x 0.1°C)
Transmit temperature in the event of change of	*not due to a change*	Only send cyclically (if enabled)
	0.2 K *0.3 K* ***0.5 K*** *0.7 K* *1 K* *1.5 K* *2 K*	Send if the value has changed by the selected amount since the last transmission.
Send temperature cyclically	***do not send cyclically*** *every min,* *every 2 min.* *every 3 min.* *…* *every 45 min.* *every 60 min.*	How often should the current measured value be resent?

---

[25] Only available for I2
[26] Only available for I2

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

7.8 Parameters for direct control of the dimming actuator

ⓘ The parameter *Control channel C1 directly* determines whether the input functions as a direct control for C1 or purely as a KNX binary input.
Channel I1 is configured for direct control of the actuator in the ETS default setting.
A button connected to I1 will therefore have a direct internal effect on channel C1.

ⓘ If the operation of the dimmer requires 2 buttons (dimming brighter / darker), i.e. 2 inputs, then I2 will be automatically configured for direct control.

ⓘ If the operation of the dimmer requires only one button (one button operation), then input I2 is freely available as a KNX binary input.

ⓘ If an input is configured for direct control, it has no bus connection, i.e. no communication objects.

7.8.1 Control channel C1 directly

Designation	Values	Description
Channel function	*Switch..* *Button..* **Dimming..** *Blinds..* *Window contact..*	A direct control of the dimming actuator (C1) is only possible with the dimming function.
Control channel C1 directly[27]	***yes***	**I1 is used exclusively as an input for dimming actuator channel C1.** I1 is connected to C1 internally and has no communication objects. I2 will be integrated automatically, if required.
	No	I1 is used purely as a KNX binary input. There is no internal connection to the switch actuator.
Debounce time[28]	*30 ms, 50 ms, 80 ms* *100 ms, 200 ms,* *1 s, 5 s, 10 s*	In order to avoid disruptive switching due to bouncing of the contact connected to the input, the new status of the input is only accepted after a delay time. Larger values ($\geq$ 1 s) can be used as a switch-on delay
Long button push starting at[29]	**300 ms**, *400 ms* *500 ms, 600 ms* *700 ms, 800 ms* *900 ms, 1 s*	Serves to clearly 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.
Double-click additional function	**no** *yes*	No double-click function The **double-click** parameter page is shown.
Time for double-click[30]	**300 ms**, *400 ms* *500 ms, 600 ms* *700 ms, 800 ms* *900 ms, 1 s*	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.

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[27] Direct control: This parameter is only available at I1 and only for the dimming function.
[28] Applies here to I1 and for I2 if used.
[29] Applies here to I1 and for I2 if used.
[30] Applies here to I1 and for I2 if used.

7.8.2 Dimming I1 directly parameter page

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 button. Short button push = ON/OFF Long button push = brighter/darker release = stop
		ⓘ I2 is not required, and freely available
		With the other variants, the dimmer is operated using 2 buttons (rocker).
	brighter / ON	Short button push = ON Long button push = brighter Release = stop
		ⓘ I2 is automatically preallocated with *darker / OFF*.
	brighter / INVERT	Short button push = ON / OFF Long button push = brighter Release = stop
		ⓘ I2 is automatically preallocated with *darker / INVERT*.

Designation	Values	Description
	darker / OFF	Short button push = OFF Long button push = darker Release = stop ⓘ I2 is automatically preallocated with *brighter / ON*.
	darker / INVERT	Short button push = ON / OFF Long button push = darker Release = stop ⓘ I2 is automatically preallocated with *brighter / INVERT*.
Increment for dimming		With a long button push, the dimming value is:
	100%	Increased (or decreased) until the button is released.
	50% *25%* *12.5%* *6%* *3%* *1.5%*	Increased by the selected value (or reduced)

7.8.3 Double-click parameter page

Designation	Values	Description
Dimming value on double-click	*0-100%*	Desired dimming value.

7.8.4 Dimming I2 directly

This parameter page is shown if I2 is required for direct control.
This is the case if, on the **Dimming input I1 directly** parameter page, the parameter *Response to long / short* **is not** set to *one button operation,* and therefore a second button is required for the opposite direction.

ⓘ If the dimmer is operated with only one button (one button operation), then input I2 is freely available as a KNX binary input.

Designation	Values	Description
Response to long / short[31]	*brighter / ON*	If I1 = darker / Off
	brighter / INVERT	If I1 = darker / INVERT
	darker / OFF	If I1 = brighter / ON
	darker / INVERT	If I1 = brighter / INVERT
Double-click additional function	**no**	No double-click function
	yes	Parameter *dimming value on double-click* is shown.
Dimming value on double-click	*0-100%*	Desired dimming value.

ⓘ The following settings are taken over from I1, and do not have to be entered again at I2: *debounce time, long button push from, time for double-click.*

---

[31] Automatically preset, not changeable.

Flush-mounted dimming actuators DU 1, DU 1 RF, DU 1 S RF

8 Application examples

These application examples are designed to aid planning and are not to be considered an exhaustive list.
They can be extended and updated as required.

8.1 Direct control: Basic configuration

In this configuration, dimming channel C1 is operated directly with a button connected to I1.

In this case, I2 is purely a KNX binary input[32] without direct control, controlling a switch actuator RM 4 U

8.1.1 Devices

- DU 1 (4942570)
- RM 4 U (4940223)

8.1.2 Overview

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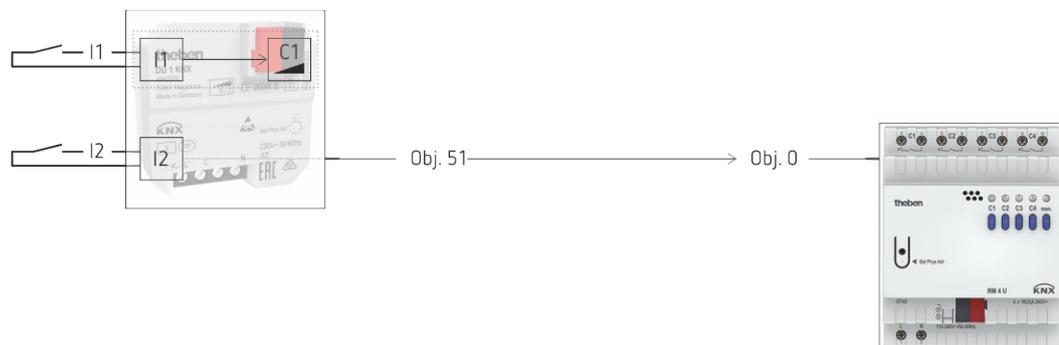
[32] Since the parameter of I1, *response to long/short,* is set to *one button operation,* I2 is not necessary for the direct control of the dimmer.

8.1.3   Objects and links

The communication objects of C1 are all available for further functions.
A basic function (C1 On / Off, brighter / darker) is provided by operating the button at I1.

In this case, input I1 has no communication objects.

No.	DU 1 Object name	No.	RM 4 U Object name	Comment
51	*Channel I2.1 - switching*	0	*Channel C1 - switch object*	Button at I2 switches the first channel of the RM 4 U.

8.1.4   Important parameter settings

Standard or customer-defined parameter settings apply to unlisted parameters.

DU 1:

Parameter page	Parameter	Setting
General	*Use binary inputs*	**Yes**
C1 configuration options	*–[33]*	-
External inputs		
I1 configuration options	*Function*	*Dimming*
	Control channel C1 directly	***yes***
Dimming directly	*Response to long/short*	*One button operation*
I2 configuration options[34]	*Function*	*Button*
Button object 1	*Object type*	*Switching*
	Telegram	*Change over*

RM 4 U:

Parameter page	Parameter	Setting
Configuration options	*Channel function*	*Switch on/off*
	Activation of function via	*Switch object*

---

[33] Most parameters on the **Configuration options** page are only relevant in conjunction with communication objects, and are not considered in any more detail here.
[34] Since the parameter of I1, *response to long/short*, is set to *one button operation*, I2 is not necessary for the direct control of the dimmer.

## 8.2 Controlling the dimming channel via the bus

In this example, the external inputs and the dimming actuator channel are completely separate from each other and can only be used via the KNX bus.[35]

Dimming channel C1 is operated by means of a KNX button interface (TA 2 S).
The external inputs I1, I2 control a switch actuator (RM 4 U).

8.2.1   Devices

- DU 1 (4942570)
- RM 4 U (4940223)
- TA 2 S (4969222)

8.2.2   Overview
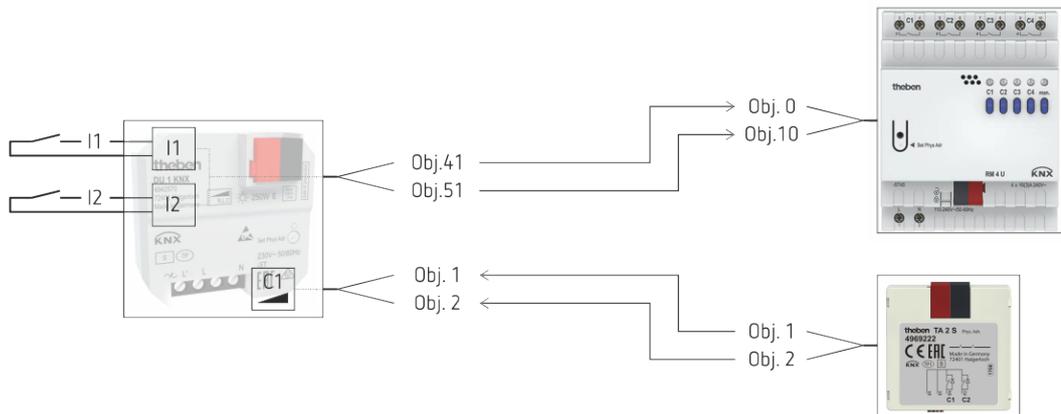
8.2.3 Objects and links

No.	DU 1 Object name	No.	RM 4 U Object name	Comment
41	*Channel I1.1 – switching*	0	*Channel C1 - switch object*	The external inputs control switch actuator RM 4 U
51	*Channel I2.1 - switching*	10	*Channel C2 – switch object*	

No.	TA 2 S Object name	No.	DU 1 Object name	Comment
1	*Channel I1 - switching*	1	*Channel C1 – Switching On/Off*	The button interface controls dimming channel C1.
2	*Channel I1 – brighter / darker*	2	*Channel C1 – brighter / darker*	

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8.2.4 Important parameter settings

Standard or customer-defined parameter settings apply to unlisted parameters.

DU 1:

Parameter page	Parameter	Setting
General	*Use binary inputs*	*Yes*
C1 configuration options	*– [36]*	*–*
External inputs		
I1, I2 configuration options	*Function*	*Button*
	Control channel C1, C2 directly	***no***
Button object 1	*Object type*	*Switching*
	Telegram	*Change over*
Button object 2	*Object type*	*Switching*
	Telegram	*Change over*

RM 4 U:

Parameter page	Parameter	Setting
Configuration options	*Channel function*	*Switch on/off*
	Activation of function via	*Switch object*

TA 2 S:

Parameter page	Parameter	Setting
Channel 1 configuration options	*Channel 1 function*	*Dimming*
Dimming	*Response to long/short*	*One button operation*

---

[36] No specific configuration required.
This dimmer can be configured with the standard or customer-defined parameter settings.

9 Appendix

9.1 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 center 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 lines via the TP medium. KNX RF products are easy to recognise in the ETS product catalogue due to the specific radio symbol.

9.2 Use of the soft switch function

9.2.1 General

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

9.2.2 Soft ON for staircase lighting

The following function is recommended for staircase lighting:
When the light switch is operated: Full brightness.
After required length of time: Lighting is slowly dimmed down and then switched off.
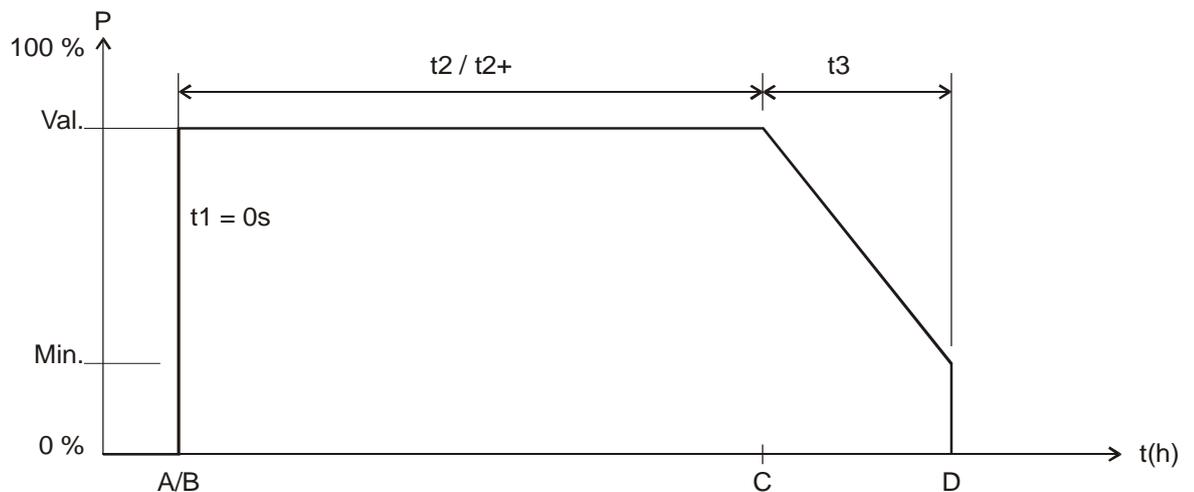
A	Button sends *Soft ON* telegram.
t1	The *Soft ON* time is equal to 0, i.e. the "Dim up slowly" function is deactivated
B	The brightness is immediately adjusted to the configured value after *Soft ON*
t2	Configured time between *Soft ON and Soft OFF*[37] *elapses*
t2+	It is possible for t2 to be extended with another *Soft ON* telegram
C	t2 or t2+ has elapsed, or a *Soft OFF* telegram was received: Start of the *Soft OFF* phase
t3	the brightness is gradually reduced within the configured time for *Soft OFF*
D	t3 has elapsed, the configured *minimum dimming value* 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.

9.2.3 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

---

[37] Soft OFF via configured time or via Soft OFF telegram.

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 button or via the motion detector (cyclic).
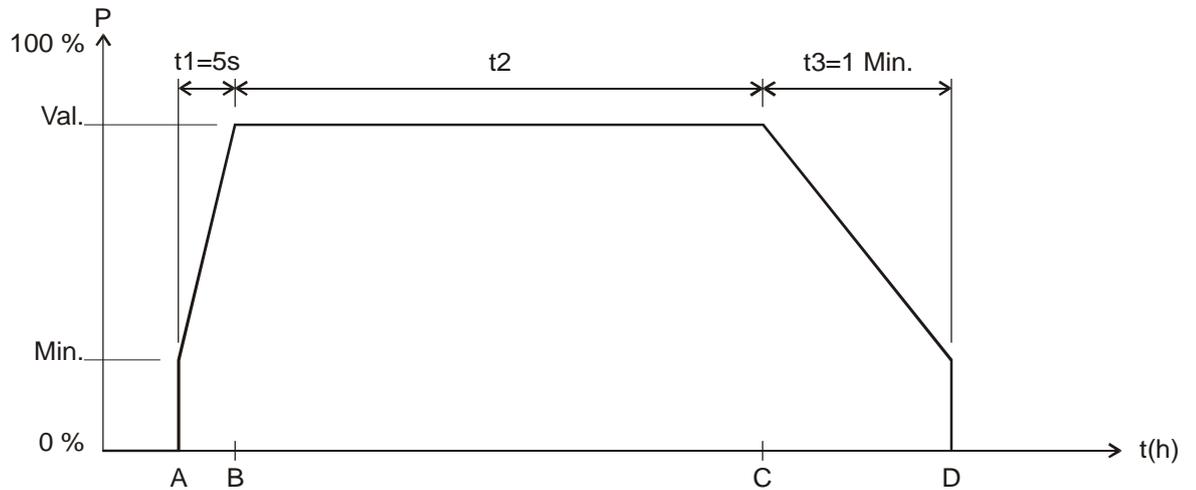

A	*Soft ON* is sent by the motion detector: The brightness is immediately adjusted to the configured *minimum dimming value*
t1	The brightness is gradually increased within the configured time for *Soft ON* (5 s)
B	Configured value after *Soft ON* is reached
t2	Time between *Soft ON (1) and Soft OFF*
C	*Soft OFF* telegram was received or configured time has elapsed: Start of the *Soft OFF* phase
t3	The brightness is gradually reduced within the configured time for *Soft OFF*
D	t3 has elapsed, the configured *minimum dimming value* has been reached and the system dims to 0%

9.2.4 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*.
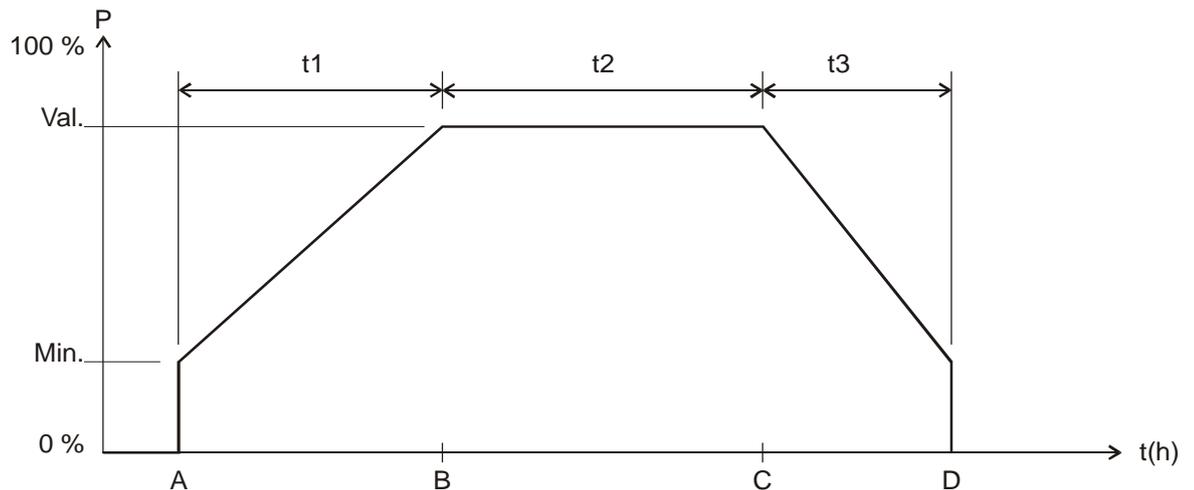
Min.	Configurable *Minimum dimming value*
Val.	Target dimming value, i.e. configured *Dimming value after Soft ON*
t(h)	Time sequence

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

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9.2.5 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
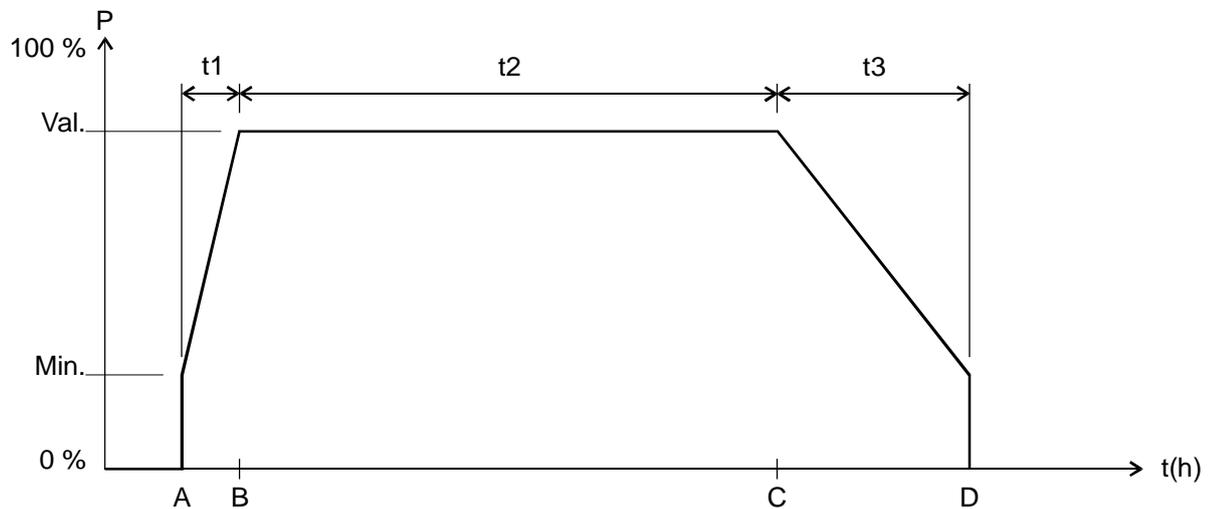
9.2.6 Soft OFF telegram during a Soft ON process

The duration of the Soft OFF phase (t3') is always equivalent to the configured time, independent of the current dimming value.
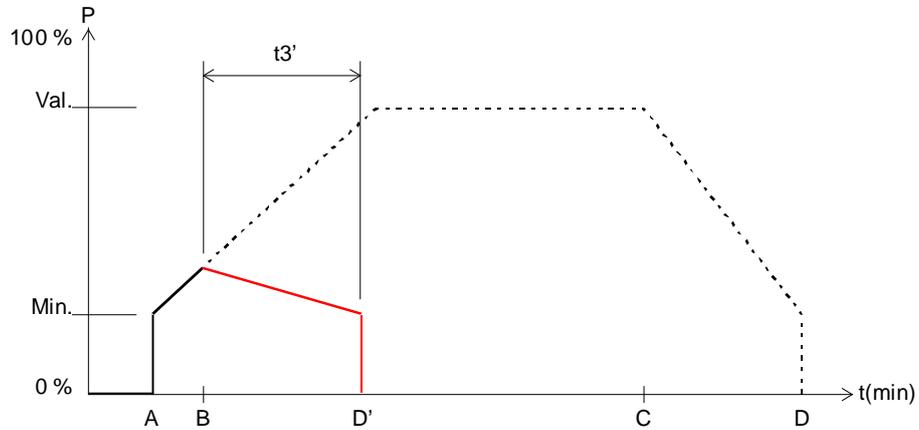
**Example 1**: Soft OFF at the start of the Soft ON phase.
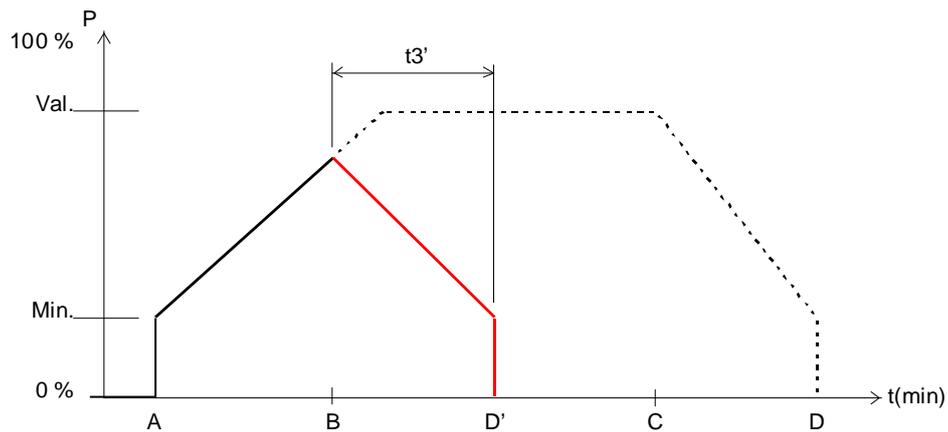
Example 2: Soft OFF at the end of the Soft ON phase.

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.
t3'	Duration of the Soft OFF phase = configured Soft OFF time
D'	End of the Soft OFF phase

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9.2.7   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.
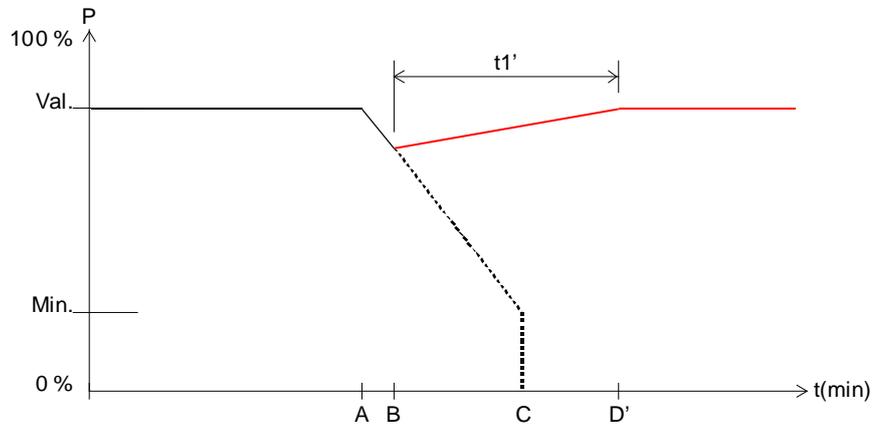
Example 3: Soft ON at the start of the Soft OFF phase.
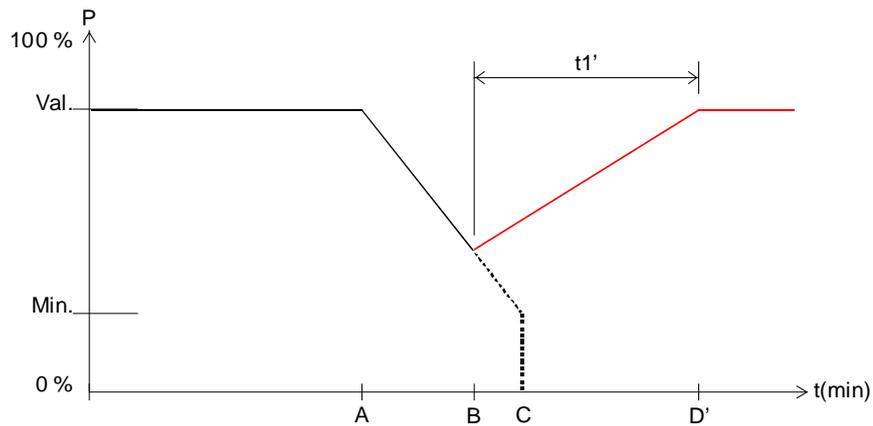
Example 4: Soft ON at the end of the Soft OFF phase.

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

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9.3 Use of the force function

**Example:** Lighting with brightness control during the daytime and minimum lighting during the night.

A brightness controller continuously measures the brightness of the room and controls the dimmer, to keep the brightness constant.
A dimming value of 20% is configured for forced operation.

In the evening at the close of work, the time switch activates forced operation, which dims down the brightness to 20%.
During the night, the lighting is switched on for a certain period of time by the night-watchmen via the central permanent ON function.
In the morning at the start of work, the time switch cancels the forced operation again and the dimmer is controlled by the brightness control.
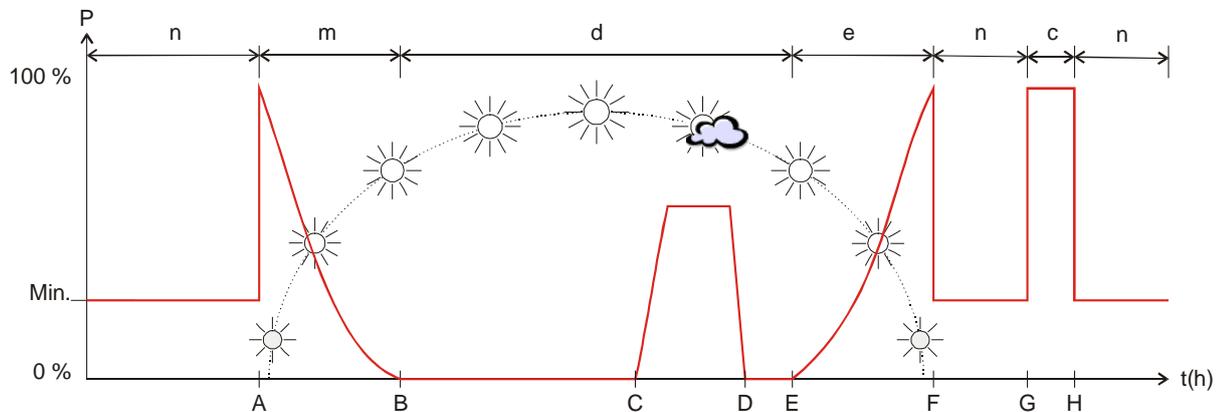
A	Forced operation is cancelled by the time switch. As the daylight is not yet bright enough, the brightness control controls the dimmer
B	The daylight is now bright enough to illuminate the room, and the dimmer is switched off
C	Heavy cloud cover, the dimmer compensates for the lack of bright daylight
D	Clear sunshine, the dimmer is turned back down
E	Late afternoon, the dimmer gradually replaces the receding daylight
F	Forced operation is activated by the time switch. The dimmer reduces the light to 20%
G	*Central permanent On = 1*
H	*Central permanent On = 0*
n	During the night time, the configured *value for forced operation* applies
c	Night round of security guards: The lighting is switched on via *central permanent On*
m	Morning: Daylight increases and the brightness control slowly reduces the dimming value
e	Evening: Daylight decreases and the brightness control slowly increases the dimming value
d	During the daytime, the dimmer is controlled by the lighting control according to the brightness of the sunlight

9.4 Dimming LED lamps

9.4.1 General

The dimmer may only operate LED lamps for 230V mains operation (so-called retrofit lamps), which are exclusively identified as dimmable.

In dimming response, there are also manufacturer- and type-related differences. For that reason we recommend only operating lights of the same type in parallel on one channel.

The maximum output in trailing edge operation (RC mode) is
200 W.
In leading edge operation (L mode) it is 24 W.

The minimum output per channel is 2 W

It may be necessary to adjust the minimum dimming value for each parameter.

9.4.2 Selection of RC or L response:

Apart from the recommendations of the LED manufacturer for the respective lamp type, the following applies:
LEDs are typically operated in RC mode in order to reduce the inrush currents of the lamps, which can lead to disruptions in the power network.
RC mode is therefore recommended, especially at high outputs.
Another advantage: Less heat is generated in the dimmer.

L mode:
Only use with LED if a disruptive flickering is noted when dimming up or down.

Note:
Some types of lamps can cause an overload in L mode, which automatically leads to dimming down the load.
In this case, automatic load detection must be selected (i.e. RC mode).

9.5 4-bit telegrams (brighter/darker)

9.5.1   Telegram format 4-bit EIS 2 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 [38]

Examples: 1111 = to dim 64 increments brighter
0111 = dim darker by 64 increments
1101 = to dim 16 increments brighter

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[38] typical application.

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9.5.2 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 from a 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 which are switched OFF 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 *Switch-on with 4-bit telegram*	4-bit Telegram	Dimmer output status	Response
yes	brighter/darker	Switched on (1%...100%)	Channel is normally dimmed.
	brighter	Off	Channel is switched on and dimmed brighter
no	brighter	Off	Dimmer stays switched off
	brighter/darker	Switched on (1%...100%)	Channel is normally dimmed.

Parameter *Switching off with a 4-bit telegram*	4-bit Telegram	Dimmer output status	Response
yes	brighter/darker	Switched on (1%...100%)	Channel is normally dimmed.
	darker	On	The channel is switched off if the button is kept depressed for longer than approx. 2 s when the minimum brightness is reached.
no	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.

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9.6 The scenes

9.6.1 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 integrated into any chosen user scene.

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

9.6.2 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
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

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Scene	Call up		Save	
	Hex.	Dec.	Hex.	Dec.
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.

9.6.3 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 in 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.

9.6.4 Storing light scenes in a button

Scenes are normally stored in the dimmer itself.
The object *Call up/save scenes* is used for this purpose.

However, if the light scenes are to be stored **externally**, for example with a scene-capable button, the following steps can be taken:
The dimmer has one dimming object (*dimming value*) and one feedback object (*feedback in %*).
2 group addresses are used here; hereafter referred to as "Gr.addr.1" and "Gr.addr.2".

9.6.5 Allocation of group addresses and setting of object flags

	Object	Connect with	set to sending	Flags			
				C	R	W	T
BUTTON	Brightness value telegram	Gr.Addr.1	yes	✓	-	✓	✓
		Gr.Addr.2	no				
DIMMER	Dimming value	Gr.Addr.1	x	✓	-	✓	x
	Feedback in %	Gr.Addr.1	no	✓	✓	-	x
		Gr.Addr.2	yes				

x = user-defined

Feedback to the dimmer should **not** be configured for *cyclical sending*.

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9.7 Conversion of percentages to hexadecimal and decimal values

Percentage value	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Hexadecimal	00	1 A	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.

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