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KNX manual
1-channel flush-mounted switch actuators
SU 1, SU 1 RF, SU 1 S RF

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Contents

1 ⚡ IMPORTANT WARNINGS!

⚠ Risk of electric shock!

- ➢ The device SU 1 RF, SU 1 S 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 inputs (min. 5.5 mm).

2 Application programs for SU 1

= SU 1 V2.x secure

= SU 1 V1.x

SU 1, SU 1 RF, SU 1 S RF flush-mounted switch actuators
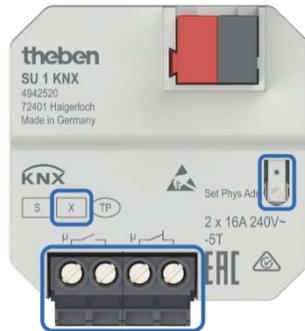
3 Function description

- 1-channel flush-mounted switch actuator.
- Adjustable features: e.g. switching, delayed switching, pulse function.
- 2 external inputs: can either be used for direct control of the actuator or as independent KNX binary inputs.
- Links, type of contact (NC contact/NO contact) and participation in central commands such as permanent on, permanent off, central switching and save/call up scene.
- Switch functions: e.g. on/off, pulse, on/off delay, staircase light with forewarning.
- Logical links: e.g. block, AND, release, OR.
- Activation of the channel function via 1-bit telegram or 8-bit threshold.
- NTC input for actual temperature measurement.
- 4-pole cable connection for external inputs.

ⓘ **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 actuator can be switched on and off directly with a button connected to 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 actuator channel can be operated with a conventional button or switch.
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

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5 Technical data

5.1 SU 1

Operating voltage	KNX bus voltage
KNX bus current	5 mA
Connection type	Screw terminals | bus connection: KNX bus terminal
Type of installation	Flush-mounted
L x W x D	44.5 x 44.5 x 32
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
Contact gap	< 3 mm (µ contact)
Switch output	Floating, 1 NC contact, 1 NO contact 16 A
Resistive load	3840 W
Incandescent/halogen lamp load	2000 W
Capacitive load	130 µF
Fluorescent lamp load (EB)	1100 W
Compact fluorescent lamps	300 W
LED lamps	< 2 W: 50 W, > 2 W: 600 W
Suitable for SELV	Yes
Number of binary inputs	2
Ambient temperature	-5 °C … +45 °C

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5.2 SU 1 RF, SU 1 S RF

Operating voltage	230 − 240 V AC, 50 − 60 Hz
Standby output	< 0,4 W
Connection type	Screw terminals
Type of installation	Flush-mounted
L x W x D	SU 1 RF: 48,6 x 46,8 x 22 mm SU 1 S RF: 48,6 x 44,4 x 25 mm
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
Contact gap	< 3 mm (µ contact)
Switch output	Floating, 1 NO contact 10 A
Incandescent/halogen lamp load	1800 W
Capacitive load	130 µF
Fluorescent lamp load (EB)	1100 W
Compact fluorescent lamps	300 W
LED lamps	< 2 W: 50 W, > 2 W: 600 W
Suitable for SELV	No
Number of binary inputs	2
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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ⓘ　　　The switching capacity ratings for lamps with electronic ballast, such as LEDs, compact fluorescent lamps, fluorescent lamps with EB, etc., might vary depending on the technical characteristics of the ballasts.

ⓘ　　　The switching capacity ratings refer to a relay lifetime of at least 30000 switching cycles.

ⓘ　　　It is possible to exceed the switching capacity ratings for these lamps. However, this will reduce the lifetime of the relay.

⚠ Generally, it is not allowed to exceed the current and voltage ratings stated on the device!

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 SU 1, SU 1 RF, SU 1 (S) RF application programs

7.1 Selection in the product database

Manufacturer	Theben AG
Product family	Output
Product type	SU 1, SU 1 RF, SU 1 S RF
Program name	SU 1[2]
	SU 1 secure[3]
	SU 1 RF
	SU 1 (S) RF[4]

Number of communication objects	25
Number of group addresses	254
Number of associations	255

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

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[2] V1.0…V1.2
[3] V2.0…
[4] V2.0…

7.2 Overview of communication objects

7.2.1 Switch actuator

No.	Object name	Function	Length	R	W	C	T	DPT
1	Channel C1	Switch object	1 bit	-	W	C	-	1.001
		Threshold 0..65535	2 bytes	-	W	C	-	7.001
		Threshold EIS 5 (DPT 9.xxx)	2 bytes	-	W	C	-	9.xxx
		Threshold as a percentage	1 byte	-	W	C	-	5.001
		Threshold 0..255	1 byte	-	W	C	-	5.010
2	Channel C1	Switching with priority	2 bits	-	W	C	-	2.001
3	Channel C1	Logic input in XOR gate	1 bit	-	W	C	-	1.002
		Logic input in AND gate	1 bit	-	W	C	-	1.002
		Logic input in OR gate	1 bit	-	W	C	-	1.002
4	Channel C1	Block	1 bit	-	W	C	-	1.001
5	Channel C1	Call up/save scenes	1 byte	-	W	C	-	18.001
6	Channel C1	Block scenes = 1	1 bit	-	W	C	-	1.001
		Enable scenes = 1	1 bit	-	W	C	-	1.003
7	Channel C1	On/Off feedback	1 bit	R	-	C	T	1.001
8	Channel C1	Time to next service	2 bytes	R	-	C	T	7.007
		Operating hours feedback	2 bytes	R	-	C	T	7.001
9	Channel C1	Service required	1 bit	R	-	C	T	1.001
10	Channel C1	Reset operating hours	1 bit	-	W	C	-	1.001
		Reset service	1 bit	-	W	C	-	1.001
40	Alarm	Excess temperature	1 bit	R	-	C	T	1.005

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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
43	*Channel I1.3*	*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 % [5]	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 %* [6]	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

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[5] Upon double-click with object type = *height % + slat %*
[6] Upon double-click with object type = *height % + slat %*

7.3 Description of communication objects

7.3.1 Objects for the switch actuator

Object 1: Switch object, threshold as a percentage, threshold 0..255,
threshold DPT 9.xxx, threshold 0..65535
Input object: this object activates the set channel function (see parameter: *Channel function*).

The set channel function can either be activated via 1-bit telegram or by exceeding a threshold (8- or 16-bit telegram).

Parameter		Activation of channel function via
Activation of function via	*Type of threshold object*	
Switch object		1-bit telegram
Exceeding the threshold	*Object type: Per cent (DPT 5.001)*	Exceeding per cent value
	Object type: Counter value 0..255 (DPT 5.010)	Any value in given numerical range
	Object type: Counter value 0..65535 (DPT 7.001)	
	Object type: EIS5 e.g. CO2, brightness (DPT 9.xxx)	2-byte floating-point number

Object 2: Switching with priority

Priority control:

Status of object *Switching with priority*	Channel status
0	As specified by the input object[7]
1	
2	OFF
3	ON

Object 3: Logic input in AND gate, in OR gate, in XOR gate
Only available if link is activated (*Configuration options* parameter page).
Forms a logical link together with the input object to activate the channel function.

Object 4: Block
Blocks the channel function.
Responses to the block being set and cancelled can be configured if the block function has been activated (*Configuration options* parameter page).

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[7] Also in the case of direct control: button / switch at l1

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Object 5: Call up/save scene

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 channel status.
It does not matter how this status is produced (whether via switch commands, central objects or the buttons on the device).
The saved status is restored when it is called up.

All scene numbers from 1 to 64 are supported.
Each channel can participate in up to 8 scenes.

See appendix: *Scenes*

Object 6: Block scenes = 1, enable 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 7: On/Off feedback

Reports the current channel status.
The status can also be inverted depending on configuration.

Object 8: Time to next service, operating hours feedback

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 time to the next service or the current status of the hour counter.

Object 9: Service required

Only available if the hour counter function has been 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 10: Reset service, reset operating hours

Function	Usage
Reset service[8]	Reset service interval counter.
Reset operating hours[9]	Reset hour counter

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[8] Depending on configuration
[9] Depending on configuration

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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 with 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

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 with 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[10]
Sends the temperature measured at input I2 (remote sensor or floor temperature sensor).

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

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7.3.7 Common objects

Object 40: Excess temperature
Reports when the device has reached too high a temperature, e.g. because the maximum current has been exceeded, and has switched the output off.

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).

(i) 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).

(i) 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 Switch actuator

Parameter page	Description
General	General parameters: Collective feedback and relay switch delay.
Switch actuator channel C1	
Configuration options	Characteristics of channel and activation of additional functions (scenes, links, etc.).
Contact characteristics	Type of contact and status after download, bus failure, etc.
Threshold	Settings for triggering channel function through exceeding threshold.
Block function	Type of block telegram and response to blocking.
Scenes	Selection of scene numbers relevant to the channel.
Feedback	Status of feedback object, etc.
Hour counter and service	Type of hour counter and, if applicable, service interval, etc.
Link	Selection of logical link.

7.4.2 External inputs

External inputs 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*.

7.5 General parameters

7.5.1 General

Designation	Values	Description
Use external inputs	*No*	The actuator is exclusively controlled via the bus.
	Yes	2 binary inputs are available. Possible functions: I1: Control actuator directly (button/switch function) or KNX binary input. I2: Universal binary input with temperature.
Send excess temperature alarm[11] cyclically	*always cyclically*	The alarm info object always sends the current status cyclically and in the event of a change:
	only send cyclically in case of an error	Only sends in case of an error, cyclically and in the event of a change.
Cycle time	*every min* *every 2 min* *every 3 min* ... *every 30 min* *every 45 min* *every 60 min*	Cycle time for the alarm info object

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(i) [11] When the temperature in the device increases too much due to overloading, the output is switched off and an alarm telegram is sent.
Normal operation cannot be resumed until the temperature has dropped by around 40 K.

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7.6 Parameters for the switch actuator channel C1

7.6.1 *Channel C1: Configuration options*

Designation	Values	Description
Channel function	***Switching on / off..*** *On/off delay.. Pulse function.. Staircase light time switch with forewarning function.. Flashing..*	Determines the basic functionality of the channel.
Activation of function via	**Switch object**	The channel is operated via a 1-bit object.
	Exceeding the threshold	The channel is operated through exceeding a 1- or 2-byte threshold. See below: the "Threshold" parameter page
Adjust block function	*Yes..*	The block function can be individually adjusted. The relevant parameter page is shown.
	no	The block function works with the standard parameters: - *Block with 1 (standard)* - *When the block is set: Unchanged* - *When the block is cancelled: Update.*
Activate scenes	*Yes.. no*	Should scenes be used?
Participation in central objects	*no*	Central objects are not taken into account.

Designation	Values	Description
	in central switching, permanent ON, permanent OFF *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	*Yes..* ***no***	The feedback function can be individually adjusted. The relevant parameter page is shown. The *Feedback* function works with the standard parameters: - *not inverted* - *do not send cyclically*
Activate hour counter	*Yes..* ***no***	Is the hour counter/service interval function to be used?
Activate link	*Yes..* ***no***	Use logical links with the channel object?

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7.6.2 *Contact characteristics*

Designation	Values	Description
Type of contact	**NO contact**	Standard: The relay contact is closed when a switch-on command is issued.
	NC contact	Inverted: The relay contact is opened when a switch-on command is issued.
Status with download and bus failure[12]		After download or with bus voltage failure…
	OFF	..the relay switches off.
	ON	..the relay switches on.
	unchanged	…the relay remains in the same state as before.
		(i) If several switching operations were executed immediately before bus or mains failure, the energy may not be sufficient for an additional switching operation. In this case, the relay remains in its previous state, regardless of the parameter setting.
Status with restoration of the bus supply[13]		After restoration of bus or mains voltage…
	OFF	..the relay is switched off.
	ON	..the relay switches on.
	same as before failure	…the relay remains in the same state as before.

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[12] Only SU 1
[13] SU 1 RF, SU 1 S RF: Mains restoration

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7.6.3 The "On/off delay.." time function

This parameter page appears if *On/off delay* is chosen as the *Channel function*.

Designation	Values	Description
Switch-on delay		
Hours	*0*..3	Input of desired switch-on delay in hours.
Minutes	*0*..60	Input of desired switch-on delay in minutes.
Seconds	*0*..255	Input of desired switch-on delay in seconds.
Switch-off delay		
Hours	*0*..3	Input of desired switch-off delay in hours.
Minutes	*0*..60	Input of desired switch-off delay in minutes.
Seconds	*0*..255	Input of desired switch-off delay in seconds.

7.6.4 The "Pulse" time function

This parameter page appears if *Pulse function* is chosen as the *Channel function*.

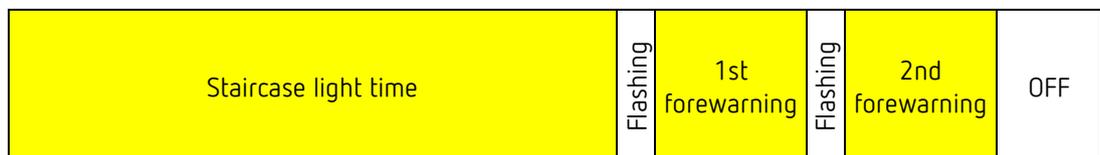| Designation	Values	Description
Hours	*0..3*	Input of desired pulse duration in hours.
Minutes	*0..60*	Input of desired pulse duration in minutes.
Seconds	*0..255*	Input of desired pulse duration in seconds.
Pulse can be retriggered (with 1 on switch object)	*Yes* *no*	The pulse can be extended as often as desired via a 1-telegram The pulse cannot be extended.
Pulse can be reset (with 1 on switch object)	*Yes* *no*	The pulse can be ended early at any time via a 0-telegram. The pulse cannot be ended early

theben

7.6.5 The "Staircase light with forewarning function .." time function

This parameter page appears if *Staircase light with forewarning function* is chosen as the *Channel function*.
The user can press a button again to extend the staircase light time at any time.

Designation	Values	Description
Staircase light time (min. 1 s)		
Hours	**0**..3	Input of desired switch-on delay in hours.
Minutes	**0**..60	Input of desired switch-on delay in minutes.
Seconds	**0**..255	Input of desired switch-on delay in seconds.
The maximum sum of pulses	1..40 *Default value* = **5**	Determines how often the staircase light time can be extended (restarted) by pressing the button again.
Duration of *1st forewarning in s*	0	The light switches off immediately once the staircase light time is completed.
	1..60 *Default value* = **10**	Once the staircase light time is completed, the light should flash briefly and then stay on for the duration of the forewarning
Duration of *2nd forewarning in s*	0	No 2nd forewarning. The light switches off at the end of the 1st forewarning.
	1..60 *Default value* = **30**	Second forewarning: Once the 1st forewarning is completed, the light should flash briefly and then stay on for the duration of the 2nd forewarning. The light switches off when this time is completed.

Example: forewarning function

Staircase light time	Flashing	1st forewarning	Flashing	2nd forewarning	OFF

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7.6.6 The "Flashing" time function

This parameter page appears if *Flashing* is chosen as the *Channel function*.

Designation	Values	Description
ON phase of flash pulse		
Hours	*0..3*	Input of desired pulse time in hours.
Minutes	*0..60*	Input of desired pulse time in minutes.
Seconds	*0..255*	Input of desired pulse time in seconds.
OFF phase of flash pulse		
Hours	*0..3*	Input of desired length of break in hours.
Minutes	*0..60*	Input of desired length of break in minutes.
Seconds	*0..255*	Input of desired length of break in seconds.
How often should it flash	*Until it switches off* *1 x* *2 x* ***3 x*** *4 x* *5 x* *7 x* *10 x* *15 x* *20 x* *30 x* *50 x*	The channel flashes until a switch-off telegram is received. The channel flashes as often as set here.

7.6.7 Threshold

This page is shown if the *Activation of the function by exceeding threshold* parameter is set.

Designation	Values	Description
Type of threshold object	**Per cent** *(DPT5.001)* *Counter value 0..255 (DPT 5.010) Counter value 0..65535 (DPT 7.001) Floating-point number (DPT9), e.g. temperature, brightness, etc.*	Threshold format
Parameter for threshold object *Per cent*		
Threshold	*1..99%* *Default value =* **50%**	Desired threshold. Example of NO contact with response as switch object = 1: Switches on when: Object value > threshold Switches off when: Object value < threshold - hysteresis
Hysteresis (as %)	*1..99%* *Default value =* **10%**	The hysteresis prevents frequent switching after small fluctuations in readings.
Parameter for threshold object *Counter value 0..255*		
Threshold	*1..254* *Default value =* **127**	Desired threshold. Example of NO contact with response as switch object = 1: Switches on when: Object value > threshold Switches off when: Object value < threshold - hysteresis
Hysteresis	*1..254* *Default value =* **5**	The hysteresis prevents frequent switching after small fluctuations in readings.
Parameter for threshold object *Counter value 0..65535*		
Threshold	*1..65534* *Default value =* **1000**	Desired threshold. Example of NO contact with response as switch object = 1: Switches on when: Object value > threshold Switches off when: Object value < threshold - hysteresis
Hysteresis	*1..65534* *Default value =* **5**	The hysteresis prevents frequent switching after small fluctuations in readings.
Parameter for threshold object *Floating-point number (DPT9), e.g. temperature, brightness, etc.)*		
Threshold	*-671088.64.. 670760.96* *Default value =* **20**	Desired threshold. Example of NO contact with response as switch object = 1: Switches on when: Object value > threshold Switches off when:

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Designation	Values	Description
		Object value < threshold - hysteresis
Hysteresis	*0.01..* *670760.96* *Default value* = **1**	The hysteresis prevents frequent switching after small fluctuations in readings.
Response on exceeding the threshold		Should the channel switch on or off on exceeding the threshold? The set type of contact must be taken into account here.
	As switch object = 0	NO contact: the relay switches off if threshold is exceeded. NC contact: the relay switches on if threshold is exceeded.
	As switch object = 1	NO contact: the relay switches on if threshold is exceeded. NC contact: the relay switches off if threshold is exceeded.

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7.6.8 Block function

This page appears when "Adjust block function" is selected on the *Configuration options* parameter page.

Designation	Values	Description
Block telegram	***Block with 1 (standard)***	0 = cancel block 1 = block
	Block with 0	0 = block 1 = cancel block Note: The block is always deactivated after reset.
Response when the block is set	*OFF*	Switch off
	ON	Switch on
	unchanged	No response
Response when the block is cancelled	*OFF*	Switch off
	ON	Switch on
	unchanged	No response
	update	Restore normal operation and switch relay accordingly.

7.6.9 Scenes

This page appears when the scenes are activated on the *Configuration options* parameter page. Each channel 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 "Status after download" (see below). See appendix: Teaching in 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.
Status after download	**Off** *On*	New switching status which is to be allocated to the selected scene number. Only possible if the scene statuses are to be overwritten after download.
Permit teach-in	*No*	Scenes can only be called up.
	Yes	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
Status after download	**Off**	See above.

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Designation	Values	Description
	On	
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
Status after download	**Off** *On*	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
Status after download	**Off** *On*	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
Status after download	**Off** *On*	See above.
Permit teach-in	*No* **Yes**	See above.
Channel reacts to	*No scene number* *Scene number 1* *...* **Scene number 6** *...* *Scene number 63*	Sixth of the 8 possible scene numbers
Status after download	**Off** *On*	See above.
Permit teach-in	*No* **Yes**	See above.
Channel reacts to	*No scene number* *Scene number 1* *...* **Scene number 7** *...*	Seventh of the 8 possible scene numbers

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Designation	Values	Description
	Scene number 63	
Status after download	***Off*** *On*	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
Status after download	***Off*** *On*	See above.
Permit teach-in	*No* ***Yes***	See above.

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7.6.10 Feedback

Designation	Values	Description
Reported status	***Not inverted***	Channel switched on: feedback object sends a 1
	inverted	Channel switched on: feedback object sends a 0
Send feedback cyclically	***No*** *yes*	Send at regular intervals?
Time for cyclical transmission of feedback	*2 minutes, 3 minutes, 5 minutes, 10 minutes,* **15 minutes**, *20 minutes, 30 minutes, 45 minutes 60 minutes*	At what interval?

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7.6.11 Hour counter and service

This page appears when *Activate hour counter* is selected on the **Configuration options** parameter page.

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?

7.6.12 Link

Designation	Values	Description
Activate link		Selection of logical link with the channel object
	AND link	The *Logic input in AND gate* object appears.
	OR link (override)	The *Logic input in OR gate* object appears.
	XOR link	The *Logic input in XOR gate* object appears.
Block object affects logic object	**No**	The block object only affects the input object. If required, the logic object can activate the channel function despite block (with OR and XOR link).
	yes	The block object affects the input object and the logic object. The channel function is completely blocked if the block is active.

7.7 Parameters for the external inputs I1, I2[14] purely as KNX binary inputs

ⓘ If direct control is not required, inputs I1 and I2[15] 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..*** [16] *Button..* [17] *Dimming..* *Blinds..*	Desired use.
Control channel C1 directly	*yes*	*I1 is used exclusively as an input for switch 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 (≥ 1s) can be used as a switch-on delay
Activate block function	**no**	No block function.
	yes	Show parameters for the block function.
Block telegram	***Block with 1 (standard)***	0 = cancel block 1 = block
	Block with 0	0 = block 1 = cancel block

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[14] I2 has no direct control and is therefore always purely a KNX binary input.
[15] I2 has no direct control and is therefore always purely a KNX binary input.
[16] Direct control of C1 possible (switch actuator).
[17] Direct control of C1 possible (switch actuator).

Designation	Values	Description
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 3 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***	The block function is ineffective with this telegram.	

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[18] SU 1 RF, SU 1 S RF: Mains restoration

Designation	Values	Description
	no response	Do not respond when the block is set.
	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.. [19]* *Button.. [20]* *Dimming..* *Blinds..*	Desired use.
Control switch actuator directly[21]	*yes*	*I1 is used exclusively as an input for switch 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 ($\geq$ 1s) 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.

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[19] Direct control of C1 possible.
[20] Direct control of C1 possible.
[21] Direct control: This parameter is **only available for I1** and only for the switch / button function.

Designation	Values	Description
Activate block function	**no**	No block function.
	yes	Show parameters for the block function.
Block telegram	**Block with 1 (standard)**	0 = cancel block 1 = block
	Block with 0	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[22]	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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[22] SU 1 RF, SU 1 S RF: Mains restoration

SU 1, SU 1 RF, SU 1 S RF flush-mounted switch actuators

7.7.3 Input I1, I2: Dimming function

Designation	Values	Description
Channel function	*Switch..* *Button..* **Dimming..** *Blinds..*	The input controls a dimming 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 ($\geq$ 1s) 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.

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.
	object type = percentage value 1 byte		
	*0-**100%***		Any percentage value between 0 and 100% can be sent.
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.
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.
Response when the block is cancelled	***no response***		Do not respond when the block is cancelled.

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[23] SU 1 RF, SU 1 S RF: Mains restoration

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Designation	Values	Description
	as with double-click	Respond as with a double-click.

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)

Designation	Values	Description
Response after restoration of the mains or bus supply[24]	*none*	Do not respond.
	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

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[24] SU 1 RF, SU 1 S RF: Mains restoration

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7.7.4 Input I1, I2: Blinds function

Designation	Values	Description
Activate channel	**no** yes	Use input?
Channel function	Switch.. Button.. Dimming.. **Blinds..**	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 (≥ 1s) 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.

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)	
	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[25]	***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.

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[25] SU 1 RF, SU 1 S RF: Mains restoration

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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.

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 mains or bus supply	**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

7.7.5 Input I2: Temperature input[26]

Designation	Values	Description
Channel function	*Switch..* *Button..* *Dimming..* *Blinds..* **Temperature input[27]**	The input is connected to a temperature sensor.
Sensor type	**Remote sensor 1 (9070191)** *Remote sensor IP 65 (9070459)* *Floor sensor (9070321)*	External temperature sensor 1 Item no. 9070191, for surface-mounted installation. External temperature sensor RAMSES IP65 Item no. 9070459, for surface-mounted installation. 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* *0.2 K* *0.3 K* **0.5 K** *0.7 K* *1 K* *1.5 K* *2 K*	Only send cyclically (if enabled) 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?

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[26] Only available for I2

[27] Only available for I2

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7.8 Parameters for direct control of the switch 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 switch actuator in the ETS default setting.

A button or switch connected to I1 will therefore have a direct internal effect on the switch actuator channel C1.
I2 is always purely a KNX binary input without an internal connection to C1.

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

7.8.1 Control switch actuator directly, switch function

Designation	Values	Description
Function	*Switch..* [28] **Button**.. [29] *Dimming..* *Blinds..*	Direct control of the switch actuator (C1/C2) is only possible with the switch or button functions.
Control switch actuator directly[30]	**yes**	**Input is used exclusively for switch actuator channel C1.** I1 is connected to C1 internally and has no communication objects.
	No	Input 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 (≥ 1s) can be used as a switch-on delay

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[28] Direct control of C1 possible.
[29] Direct control of C1 possible.
[30] Direct control: This parameter is only available for I1 and only for the switch/button function.

7.8.1.1 Direct switching parameter page

This page replaces the switch object 1, 2 parameter pages.

Designation	Values	Description
Switching status if input = 1	***On*** *Off* *Change over*	Switching status if voltage is present at the input?
Switching status if input = 0	*on* ***off*** *Change over*	Switching status if no voltage is present at the input?

7.8.2 Control switch actuator directly, button function

If the function *Control switch actuator directly* is activated, only the required parameters are displayed on the input parameter pages.

Designation	Values	Description
Function	*Switch..* *Button..* *Dimming..* *Blinds..*	Desired use.
Control switch actuator directly[31]	***yes*** *No*	**I1 is used exclusively as an input for switch actuator channel C1.** I1 is connected to C1 internally and has no communication objects. 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 ($\geq$ 1s) 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.

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[31] Direct control: This parameter is only available for I1 and only for the switch/button function.

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7.8.2.1 Direct switching parameter page

This page replaces the switch object 1, 2 parameter pages.

Designation	Values	Description
Response after short operation	*No response* **Switching**	Execute a switch command after a short button push?
Switching status	*On* *Off* **Change over**	Switching status.
Response after long operation	***No response*** Switching	Execute a switch command after a long button push?
Switching status	*On* *Off* **Change over**	Switching status.
Response after double-click	***No response*** Switching	Execute a switch command after a double-click?
Switching status	*On* *Off* **Change over**	Switching status.

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 of switch actuator: Basic configuration

In this configuration, the switch actuator channel C1 is operated directly with a button connected to I1.
Each time the button is pressed, the relay is switched.

I2 is always purely a KNX binary input, without direct control, and is connected to an external temperature sensor (remote sensor 1) in this case.
The measured temperature provides the actual value for a room thermostat.

8.1.1 Devices

- SU 1 (4942520)
- RAMSES 718 P (7189210)

8.1.2 Overview

ⓘ The parameters and objects of the room thermostat are not described in any more detail here. Full details can be found in the RAMSES 718 P KNX manual.

8.1.3 Objects and links

The communication objects of C1 are all available for further functions.
A basic function (C1 on/off) is provided via actuation of input I1.
The external input I1 has no communication objects.

No.	SU 1 Object name	No.	RAMSES 718 P Object name	Comment
51	*Channel I2 – actual value for temperature*	25	*External actual value*	Send current room temperature to room thermostat.

8.1.4 Important parameter settings

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

SU 1:

Parameter page	Parameter	Setting
General	*Use binary inputs*	**Yes**
C1 configuration options[32]	*Channel function*	*Switch on/off[33]*
External inputs		
I1 configuration options	*Function*	*Button[34]*
	Control channel C1 directly	**yes**
Direct switching	*Response after short operation*	*Switching*
	Switching status	*Change over*
I2 configuration options / Temperature[35]	*Function*	*Temperature input*
	Sensor type	*Remote sensor 1 (9070191)*

RAMSES 718 P:

Parameter page	Parameter	Setting
Room thermostat – actual value	*Source for actual value*	*External actual value object*

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[32] The remaining parameters on the **Configuration options** page are only relevant in conjunction with communication objects and are not considered in any more detail here.
[33] Included here as an example. All other functions can also be used.
[34] Direct control is also possible with a switch, depending on the application.
[35] When *Function = Temperature input* is selected, the name of this parameter page is **Temperature**.

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8.2 Controlling the switch actuator via the bus

In this example, the external inputs and the switch actuator channel are completely separate from each other and can only be used via the KNX bus.[36]
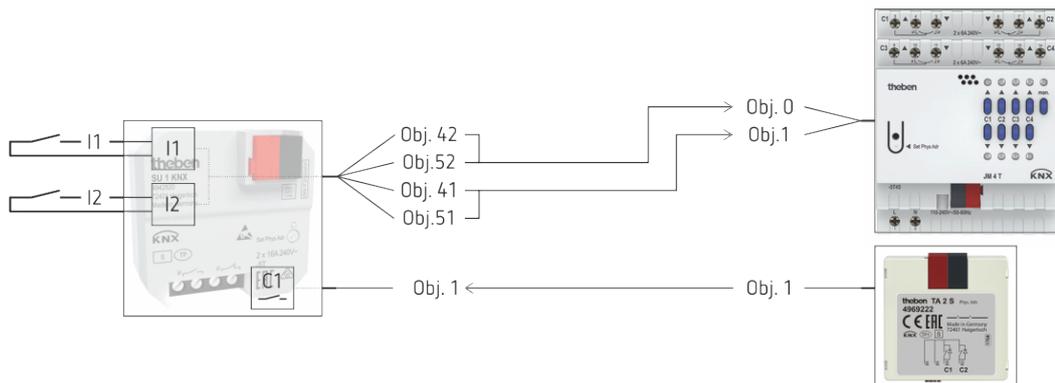
The switch actuator channel of the SU 1 is operated with the aid of a KNX button interface (TA 2 S).
The external inputs I1, I2 control a KNX blind actuator (JM 4 T).

8.2.1   Devices

- SU 1 (4942520)
- TA 2 S (4969222)
- JM 4 T (4940250)

8.2.2   Overview

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[36] Normal KNX operation, without direct control.

SU 1, SU 1 RF, SU 1 S RF flush-mounted switch actuators

8.2.3 Objects and links

No.	SU 1 Object name	No.	JM 4 T Object name	Comment
41	*Channel I1 – step / stop*	1	*Channel C1 – step / stop*	The step telegrams from I1 and I2 are sent to the same group address.
51	*Channel I2 – step / stop*			
42	*Channel I1 – up*	0	*Up / down*	The up and down telegrams from I1 and I2 are sent to the same group address.
52	*Channel I2 – down*			

No.	TA 2 S Object name	No.	SU 1 Object name	Comment
1	*Channel I1.1 – switching*	1	*Channel C1 – switch object*	The button interface controls the switch actuator channel C1.

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8.2.4   Important parameter settings

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

SU 1:

Parameter page	Parameter	Setting
General	*Use binary inputs*	*Yes*
C1 configuration options	*Channel function*	any
External inputs		
I1, I2 configuration options	*Function*	*Blinds*
	Control channel C1 directly	**no**
I1 blinds	*Operation*	*Up*
I2 blinds	*Operation*	*Down*

JM 4 T:
No specific configuration required.
This device can be configured with the standard or customer-defined parameter settings.

TA 2 S:

Parameter page	Parameter	Setting
Channel 1 configuration options	*Channel 1 function*	*Button*
Button object 1	*Object type*	*Switching (1 bit)*
	Send after short operation	*Send telegram*
	Value	*Change over*

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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 The scenes

9.2.1 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.

9.2.2 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

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![theben logo]

Scene	Call up		Save	
	Hex.	Dec.	Hex.	Dec.
48	$2F	47	$AF	175
49	$30	48	$B0	176
50	$31	49	$B1	177
51	$32	50	$B2	178
52	$33	51	$B3	179
53	$34	52	$B4	180
54	$35	53	$B5	181
55	$36	54	$B6	182
56	$37	55	$B7	183
57	$38	56	$B8	184
58	$39	57	$B9	185
59	$3A	58	$BA	186
60	$3B	59	$BB	187
61	$3C	60	$BC	188
62	$3D	61	$BD	189
63	$3E	62	$BE	190
64	$3F	63	$BF	191

Examples (central or channel-related)**:**

Call up status of scene 5:
→ Send $04 to the relevant scene object.

Save current status with scene 5:
→ Send $84 to the relevant scene object.

9.2.3 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.

9.3 Conversion of percentages to hexadecimal and decimal values

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

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