Product Manual

ABB i-bus® KNX
Universal Dim Actuator, MDRC
UD/S 2.300.2

Intelligent Installation Systems

UD/S 2.300.2

R, L, C

ABB i-bus®

EIB KNX

U_n = 230 V~
2 x 300 W/VA

ABB

This manual describes the function of the Universal Dim Actuator UD/S 2.300.2 with the application program Dim 2f 230V/1.0.
Subject to changes and errors excepted.

Exclusion of liability:
Despite checking that the contents of this document match the hardware and software, deviations cannot be completely excluded. We therefore cannot accept any liability for this. Any necessary corrections will be inserted in new versions of the manual.
Please inform us of any suggested improvements.

ABB i-bus® KNX

Contents

Contents Page

ABB i-bus® KNX   **General**

1   General

The Universal Dim Actuator type UD/S 2.300.2 is a bus enabled 2 channel dimmer for operation on the ABB i-bus® KNX.

The compact device can operate two independent lighting groups with up to 300 W maximum power for each. If only one channel is operated, the output power increases to 500 W. Both channels can be supplied from different phases.

The automatic load detection allows the operation of different types of luminaries with inverse phase control or phase angle control. As a result, incandescent lamps, 230 V halogen lamps and low-voltage halogen lamps can be connected to electronically controlled and wound transformers.

The device features a very low power consumption. This prevents inadmissible heating in the distribution board. The maximum power consumption at full load is 4.5 W.

The functionality of the UD/S 2.300.2 sets new standards. The flexibly adjustable dimming speeds and the comprehensive range of scene functions open up a whole range of possibilities. The characteristic adjustment allows optimum matching to suit the attributes of the lighting types used.

ABB i-bus® KNX   **Device technology**

2   Device technology

The Universal Dim Actuator UD/S 2.300.2 is a modular installation device (MDRC) for installation in the distribution board.

Different load types, e.g. incandescent lamps, 230 V halogen lamps or low-voltage halogen lamps on electronically controlled or conventional transformers, can be connected to two independent outputs.

However, only loads of the same type are permissible on a single channel. The detection of the load type and the setting of the mode *Phase angle control* or *Inverse phase control* are undertaken automatically.

Transformers from ABB are recommended for connection of low-voltage halogen lamps.

2.1   Technical data

Supply	Operating voltage	21...30 V DC, made available by the bus
	Current consumption KNX	Max. 12 mA
Outputs	2 load circuits	Semiconductor output, dimmed via phase angle control or inverse phase control
	Maximum load (up to 45 °C ambient temperature)	300 W/VA per channel 500 W/VA, when just one channel is connected
	Minimum load	2 W/VA
Incoming supply	2 phase inputs	The connection of different phases with a common neutral conductor is possible.
Operating voltage	Mains voltage U_s	230 V -15/+10 %, 50/60 Hz
	Mains frequency	46...55 Hz or 57... 63 Hz
	Leakage loss	Max. 4.5 W (at rated load) 500 mW in standby (outputs switched off)
Connections	KNX	Bus connection terminal
	Supply and load circuit	Screw terminals with universal head (PZ1) 0.2...4 mm² stranded, 2 x 0.2...2.5 mm² 0.2...6 mm² single core, 2 x 0.2...4 mm²
	Tightening torque	Max. 0.8 Nm
Operating and display elements	Red LED and button	For assignment of the physical address
Enclosure	IP 20	to DIN EN 60 529
Safety class	II	to DIN EN 61 140
Isolation category	Overvoltage category	III to DIN EN 60664-1
	Pollution degree	2 to DIN EN 60664-1
Temperature range	Operation	-5 °C...+45 °C
	Storage	-25 °C...+55 °C
	Transport	-25 °C...+70 °C
Design	Modular installation device (MDRC)	Modular installation device, Pro*M*
	Dimensions	90 x 72 x 64 mm (H x W x D)
	Mounting width	4 modules at 18 mm
	Mounting depth	64.5 mm
Environmental conditions	Humidity	Max. 93 %, moisture condensation should be excluded
Installation	On 35 mm mounting rail	to DIN EN 60 715
Mounting position	as required	
Weight	0.225 kg	
Housing, colour	Plastic housing, grey	
Approvals	KNX to EN 50 090-1, -2	
CE mark	in accordance with the EMC guideline and low voltage guideline	

ABB i-bus® KNX   **Device technology**

Application program	Number of communication objects	Max. number of group addresses	Max. number of associations
Dim 2f 230V/1.0	45	254	255

> **Note**
>
> The programming requires EIB Software Tool ETS2 V1.3 or higher. If ETS3 is used a *.VD3 type file must be imported. The application program is available in the ETS2 / ETS3 at
> **ABB -> Lighting -> Dimmer.**

> **Note**
>
> The device does not support the ETS encryption function. If you inhibit access to all devices of the project with a BA password (ETS2) or a BCU code (ETS3), it has no effect on this device. Data can still be read and programmed.

2.2 Circuit diagram

ABB i-bus® KNX   **Device technology**
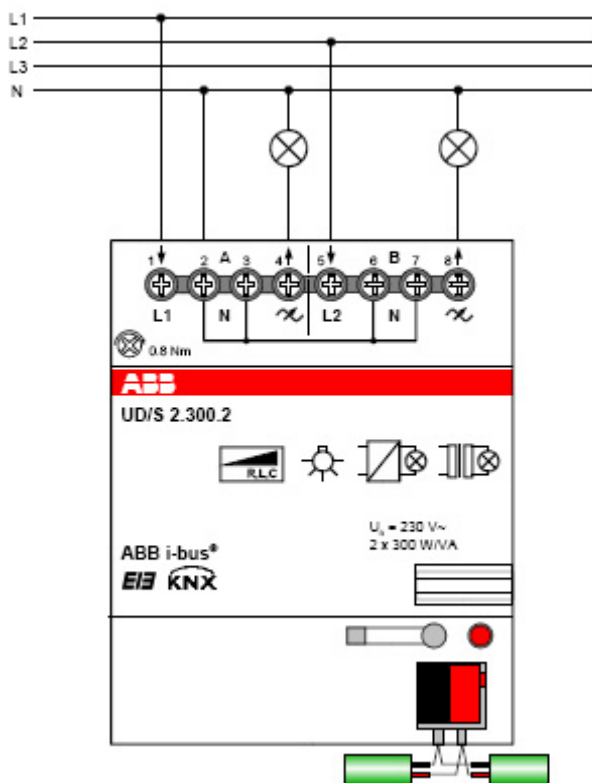
> **Note**
>
> All four neutral conductor connections on the terminals 2, 3, 6 and 7 are internally interconnected to one another. If earth-leakage circuit breakers and automatic circuit breakers with a disconnected live conductor are used, it must be considered with the individual fusing of the channels.

2.3 Dimension drawing

2.4 Assembly and installation

> **Note**
>
> The voltage supply to the device must be switched off before mounting work is performed!
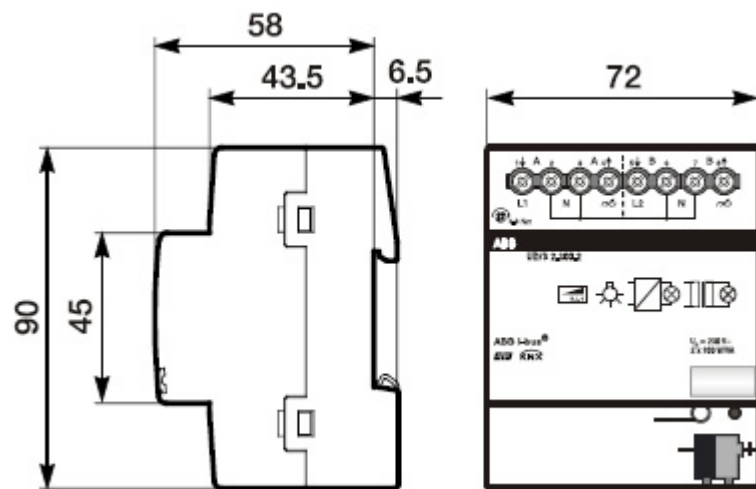
The mounting position can be selected as required.

Accessibility to the device for the purpose operation, testing, visual inspection, maintenance and repair must be must be provided (conform to DIN VDE 0100-520).

2.5 Description of the inputs and outputs

The devices has two channels, these are channels A and B. Each channel can be operated on a different phase. The supply to channel A is connected to terminal 1. The supply to channel B is connected to terminal 5.

2.6 Special operation states

Reaction on bus voltage failure
The reaction to bus voltage failure can be set individually for each channel, e.g. the brightness remains unchanged or the lamp switches off.

ABB i-bus® KNX　　　　　**Device technology**

Note
During bus voltage failure the maximum output power per channel is limited to a maximum of 250 W!

Reaction on bus voltage recovery

The reaction to bus voltage recovery can be programmed on a channel by channel basis, see . An initialisation phase lasting about two seconds occurs directly after bus voltage recovery. The outputs are switched off temporarily during the initialisation phase. Thereafter, the following communication objects send their current values:

Function	Name	Remark:
In operation	General	
Status Switch	Output A Output B	If object enabled in the parameters
Status brightness value	Output A Output B	If object enabled in the parameters
Load type	Output A Output B	
Status byte	Output A Output B	
Error message	Output A Output B	

If a load type has been set in the parameters, it will be sent on the bus via the *Load type* object after bus voltage recovery and a successful initialisation phase.

If the staircase lighting has been selected under *Select extra function*, the **staircase lighting function** after bus voltage recovery will always be activated. If *Permanent ON* was activated it will be cancelled. Using the parameter *Value object Switch on bus voltage recovery*, it is also possible to define if the channel switches on (staircase lighting time times out normally) or off.

If the **Blocking function or Forced operation** were active, they will be cancelled at bus voltage recovery.

Reaction on programming with the ETS

The device switches for the duration of programming to the *Reaction on bus voltage failure* (programmable) state. After programming is completed it will revert to the original state.

Reaction on ETS reset

The device switches for a few seconds to the *Reaction on bus voltage failure* (programmable) state. It then reverts to the original state.

Reaction on mains voltage failure

Should the mains voltage fail, the corresponding *Undervoltage in mains* bit on the channel concerned is set in the *Status byte* communication object. The object values *Status switch* and *Status brightness value* will be set to 0.

Switching commands received during the mains failure via the communication object *Switch* are stored. All other telegrams which relate to the channel which has failed are simply disregarded.

ABB i-bus® KNX   **Device technology**

Reaction on mains voltage recovery

After mains voltage recovery the device will re-establish the state which existed before mains voltage failure. If a switching command has been received during mains voltage failure, it will be executed.

As soon as the light is switched on for the first time after mains voltage recovery, the device will undertake a load detection if load detection has been set in the parameters.

How do the special functions react with mains voltage failure and recovery?	
All telegrams received during mains voltage failure which relate to the channel which has failed are simply disregarded. Exception: Switch commands to the object *Switch* are stored and executed after mains voltage recovery.	
Blocked function	If a channel was blocked by the *Block* communication object before mains voltage failure, the channel will remain blocked.
Forced operation	If a channel was subject to forced operation before mains voltage failure, the forced operation will be retained at mains voltage recovery. Telegrams received during the mains voltage failure will be disregarded.
Slave function	If the slave function was active (constant lighting control), it will continue to be active at mains voltage recovery.
Staircase lighting function	If the staircase lighting was switched on before mains voltage failure, the staircase lighting will switch back on and the staircase lighting time will recommence on mains voltage recovery.
	If the staircase lighting was switched off before mains voltage failure, the staircase lighting will remain switched off on mains voltage recovery.

Reaction on overtemperature

If the internal device temperature exceeds the permissible maximum value, the output current of both outputs is limited automatically to an effective current value of about 1 A (derating). The error object *Excess temperature* is sent with the value 1. When the value again falls below the maximum temperature, the old brightness value is re-established.

During derating the feedback objects *Status brightness value* remains unchanged. i.e., they do not indicate the limited brightness value, but rather the last brightness value set via the bus.

If the internal temperature rises above the critical value of the device, the outputs will switch off and the error object *Critical excess temperature* is sent on the bus with the value 1. All commands from the bus are ignored during a critical overtemperature.

The outputs remain off when the device has cooled down. The corresponding error object is reset again to 0.

Reaction on overcurrent

If the apparent power exceeds approx. 500 VA at 230 V AC, it corresponds to an effective current of about 2.2 A which causes a permanent overcurrent and the *Overcurrent/Short-circuit* bit is set in the *status byte*. The output remains switched on and the function remains assured.

Mains undervoltage

In this case, the end stage is switched off and the corresponding error bit is set. Commands from the bus will continue to be processed. The status objects *Switch* and *Brightness* report back with 0.

ABB i-bus® KNX   **Device technology**

Frequency error

If the mains frequency is outside the permissible range the output switches off.

The end stage is switched off if the frequency goes out of the valid frequency range. Thereafter, the device will attempt to synchronize to the frequency whereby the channel remains switched off. If this is successful, the output signal is set to ensure that it complies with the brightness value as provided via the bus.

Reaction on overvoltage pulses and overcurrent pulses

The output is switched off if load voltage peaks (overvoltage pulses) or overcurrent pulses occur, which can cause damage to the devices. The output remains switched off until the next bus telegram causes it to be switched on. The status byte is sent at the same time.

Examples
Voltage peaks may be caused by a defective transformer. As a consequence for example, a conventional transformer can be detected as an electronic transformer and the dimmer set to inverse phase control. This can then lead to voltage peaks
Inversely, an electronic transformer can be detected as a conventional transformer and the dimmer set to phase angle control. This can then lead to overcurrent peaks

Load short circuit

The device switches off the corresponding output for five seconds with a load short circuit. After the five seconds has elapsed, the device will again attempt to set the current dimming value on the output. If the short circuit has been rectified, the last brightness will be re-established.

If the short circuit has not been rectified after five seconds, the device will permanently switch off the output and set the *Overcurrent/Short circuit* error bit. If the output is switched on via the bus, a renewed test to determine a short circuit is performed.

Reaction on mains overvoltage

If the mains voltage exceeds the allowed range > 253 V AC, it is not recognised by the dimming actuator.

Underload/no-load

If no current is measured during load detection, bit 3 *Error on load detection* and bit 6 *Overload/no-load* are set in the status byte.

The device will re-attempt to switch on with the respective command. The device will carry out a new load detection if it has been programmed to do so.

Note
If bit 6 *Overload/no-load* is set in the status byte, then the communication object *Load type* has the value 1.

ABB i-bus® KNX   **Commissioning**

3   Commissioning

3.1   Overview

The application program *Dim 2f 230V/1.0* provides the device with a comprehensive and flexible range of functions. The standard settings allow simple commissioning. The functions can be extended if required.

The programming is implemented using the Engineering Tool Software ETS2 **V1.3** or higher. If ETS3 is used a *.VD3 type file must be imported.

Supplied state

The device is assigned with the physical address 15.15.255 in the factory. The application program is preloaded in the factory. The entire application can be reloaded is required. The device must be fully discharged beforehand.

A longer downtime may result if the application program is changed, after a discharge or after a download has been aborted.

The following list provides an overview of the possible functions:

	UD/S 2.300.2
Switch function	
- Brightness value when turned on	■
- Dimming speed for switch on and off	■
Dimming	
- Dimming speed can be changed via KNX	■
- Min. and max. dimming values	■
- Switch on/off via rel. dimming	■
Brightness value	■
- Dimming speed for transition brightness values	■
- Min. and max. value limits	■
- Set switch on and off via value	■
Presets (4 items)	■
Scenes (8 bit scene)	■
- Assignment of the channel in up to 18 scenes	■
Forced operation	
- 2 bit coded forced operation	■
- Behaviour after voltage recovery	■
Block activate channel via 1-bit block object	■
Special functions	
- 4 point characteristic adjustment	■
- Preference with bus voltage failure	■
- Status feedback	■
Additional functions	
- Slave mode e.g. for integration in the constant lighting control	■
- Staircase lighting,	■
Prewarning via dimming and/or KNX object	■

Table 5: Application overview

ABB i-bus® KNX   **Commissioning**

3.2   Parameters

This chapter describes the setting possibilities of the individual parameters using the parameter window of the ETS. The parameter window is set-up dynamically so that further parameter windows can be enabled depending on the parameterisation and function of the outputs.

In the following description *Output A-B* represents all outputs. All outputs can be programmed commonly or individually.

The parameter windows for each output are identical. For this reason they are only described once in the following.

The default values of the parameters are underlined, e.g.

Option: <u>no</u>
           yes

ABB i-bus® KNX   **Commissioning**

3.2.1 *General* **parameter window**

Higher level parameters can be set in the *General* parameter window.

Parameter settings

Options: channel setting global (together)
            channel setting individual

For every output an individual setting can be undertaken separately for every output. Particularly in large KNX systems, it is frequently the case that all outputs must be assigned with the same parameters. With the setting *channel setting global (together)* all settings in the device are only undertaken once and apply for all outputs.

- *channel setting global (together)*: The parameter window A-B appears: Settings apply for all channels.

- *channel setting individual*: The respective parameter window appears for every channel.

Note
With a change from individual to common programming of the parameters, the settings already implemented are not accepted.

Sending and switching delay after bus voltage recovery in s [2...255]

Options: 2...255 s

Only telegrams are received during the send and switching delay. The telegrams are not processed however and the outputs remain unchanged. No telegrams are sent on the bus.

After the sending and switching delay telegrams are sent and the state of the outputs are set to correspond to the parameterisation or the object values.

ABB i-bus® KNX   **Commissioning**

During the sending and switching delay objects can be still be read via the bus, e.g. by a visualisation system. Switching requirements and commands are implemented after the send and switching delay has been carried out.

The processor requires a starting time of about 2 seconds until it is ready to function. The initialisation time is included in the parameterised time.

Send *In Operation* object

Options: no
             send value 0 cyclically
             send value 1 cyclically

The *In Operation* object indicates the correct function of the device on the bus. This cyclic telegram can be monitored by an external device. The following parameters are visible:

Sending cycle time in s [1...65,535]

Options: 1...60...65,535

Here a time interval is set which the object *In operation* uses to cyclically send a telegram.

Limit number of telegrams

Options: no
             yes

A telegram limitation is implemented to control the bus load created by the device.

With the selection yes, the parameters *Max. Number of sent telegrams* and *in period* are released.

Max. Number of sent telegrams within period

Options: 1...20...255

in period

Options: 50 ms/100 ms/.../10 s/.../30 s/1 min

This parameter sets the number of telegrams which can be sent by the device within a period.

How does the telegram rate limitation function?

It counts the number of telegrams sent within a period. As soon as the *Max. Number of sent telegrams* is reached, no further telegrams are sent on the bus until the end of the period. A new period commences at the end of the previous period. The telegram counter is reset to zero and sending of telegrams is allowed again.

ABB i-bus® KNX   **Commissioning**

3.2.2 Parameter window
A-B: General

In Parameter window *A-B: General* the comprehensive range of parameters for the channels are defined.

Status response of switching state

Options: no
             yes: via object *Switch/Status*
             yes: via separate object *Status switch*

This setting defines if and when the current switch state of the lighting (ON/OFF) is sent on the bus.

- *No*: The switch state is not actively sent on the bus.

- *Yes: via object Switch/Status:* The switch state is sent actively on the bus via the object *Switch/Status*.

- *Yes: via separate object Status switch:* An additional object *Status switch* is enabled with which the current switch status is sent on the bus.

Note
Reporting the switching and status via the same object *Switch/Status* is useful because it simplifies the group address assignment. However, with improper programming unwanted switching actions can be triggered by the responses in a group. In a group of several objects only one object should respond with the status.

ABB i-bus® KNX   **Commissioning**

Send

Options: only if value change
             always

- *only if value change:* The feedback of the object value is sent.

- *always:* Sent with every value assignment of the object *Switch*.

Status response inverted

Options: no: 0 = OFF, 1 = ON
             yes: 0 = ON, 1 = OFF

With this parameter the response of the switching state can be inverted. It is visible if the response occurs via the object *Status switch*.

With an inverted response the object *Status switch* features the following values:

0: The lighting is switched on.
1: The lighting is switched off.

Status response of brightness value

Options: no
             yes: via object *Brightness value/Status*
             yes: via separate obj. *Status brightness value*

The setting defines how the current status brightness value of the lighting is sent on the bus.

- *No*: The brightness value is not actively sent on the bus.

- *Yes, via object Brightness value/Status:* The brightness value is actively sent on the bus.

- *Yes, via separate object Status brightness value:* An additional object *Status brightness value* is enabled with which the current brightness value is sent on the bus on a change.

The changed brightness value is sent at the end of the dimming process, i.e. when the end value is reached with switching, scene or preset call. During the dimming process the current brightness value is not displayed.

Send

Options: only if value change
             always, triggered by brightness command

- *only if value change:* Feedback is only undertaken if the object value changes.

- *always, triggered by brightness command*: Also sent with every value assignment of the object *Brightness value*.

A value assignment is implemented via switch, dim, set brightness value, scene, preset and staircase lighting call.

Reaction on bus voltage failure

Options: unchanged:
             switch off

This parameter defines if the brightness is to be retained or switched off during a bus voltage failure.

ABB i-bus® KNX   **Commissioning**

Note
During a bus voltage failure the maximum output power per channel is limited to a maximum of 250 W!

Value of object *Switch* on bus voltage recovery

Options: restore status before failure
             write with 0
             write with 1

With this parameter the load output can be set to a defined state at bus voltage recovery.

- *restore status before failure:* The brightness level before failure of the bus voltage is restored.

- *write with 0:* The object *Switch* is written with a 0 at bus voltage recovery.

- *write with 1:* The object *Switch* is written with a 1 at bus voltage recovery.

The output brightness is redefined and set in dependence on the set device parameterisation.

Example
If the parameter write with 1 is set, the device controls a brightness level of 100 % after bus voltage recovery and the *Switch ON via last brightness value* in the parameter window *A-B: Switch*. If in the parameter window *A-B: Dimming* an upper dim limit has been set, this will be undertaken.

Carry out load detection

Options: yes
             no: capacitive load
             no: inductive load

The user can prevent load detection using this parameter.

If a load has been removed, the device continuously checks if a new load has been connected.

If wrong load type is connected

Options: Carry out load detection & adapt load type
             change load type immediately
             Switch off output

This parameter is visible if no automatic load detection has been set. It defines the reaction of the output if an incorrect load type is connected.

- *Carry out load detection & adapt load type:* The channel automatically changes the mode. After a bus reset via the ETS or a recovery of the mains voltage, the device again changes to the operating mode defined in the parameters.

- *change load type immediately:* The other load type is set on a fault. Subsequently bit 3 *load type incorrectly set* is set in the status byte.
  If the same fault occurs with this load type, the lighting is switched off and the cause of the fault is documented in the status byte.

ABB i-bus® KNX   **Commissioning**

- *Switch off output:* The output switches off when a fault is detected, e.g. overvoltage due to connection of an incorrect load. The lighting switches back on with the next switch on command.

Switch off ripple control filter

Options: no
             yes

The device features an installed filter to prevent ripple control signals which could otherwise be noticeable due to a slight flicker of the lighting. The ripple control filter can be switched off in order to improve the response of the device with frequency fluctuations.

Note
Very fast frequency or phase changes of the mains voltage can still lead to a slight flicker of the lighting.
Please observe the permissible frequency range of the device which can be found at .

ABB i-bus® KNX   **Commissioning**

3.2.3 Parameter window
A-B: Function

In this parameter window additional functions of the output can be enabled.

Enable function *1-bit preset*

Options: <u>no</u>
             yes

The *Preset* function is enabled here. It is used to call or save brightness values via 1-bit objects.

> *For further information see: **Parameter window A-B Presets***

> **Restore presets with standard value during download**
>
> Options: no
>   <u>yes</u>
>
> This setting defines if the preset values are overwritten with the standard brightness values, which were set in the parameters. This is useful for example if the settings of the user are to be undone.

Enable function *8 bit scene*

Options: <u>no</u>
             yes

The *Scene* function can be enabled with this parameter. This is used to call or save brightness values via a 1-byte object.

> *For further information see: **Parameter window A-B Scene***

> **Restore scene values with standard values**
>
> Options: no
>   <u>via download</u>
>   via object *restore standard scene*
>   via download or via object
>
> This setting defines if and when the scene values are overwritten with the standard brightness values, which were set in the parameters. This function is useful for example if the scene settings of the user are to be undone.

ABB i-bus® KNX   **Commissioning**

- *No:* The scene values are not overwritten. They can only be changed via the communication object 8 bit scene.

- *via download:* When programming the device the scene values are overwritten with the parametered values.

> **Note**
>
> The 8 bit scene values set by the user via the communication object are thus overwritten.

- *Object restore standard scene:* The scene values can only be reset to the standard values via the bus.

- *via download or via object:* This is a combination of both previous settings.

> **Note**
>
> If you have selected the settings *no* or *restore standard scene*, it may be that no scene values are saved in the device. In this case the reaction of the device with a scene call is undefined!

Enable function *forced operation*

Options: no
             yes

The object *Forced operation* is enabled via this parameter.

Brightness while object value = 3 (forced operation = active, ON)

Options: 100 %/95 %/…/5 %/0 %

This parameter is visible if the additional function *Enable function Forced operation* has been activated. Here the brightness value is defined which is set, if the object *Forced operation* is set with the value 3 (= forced operation = active, ON).

After forced operation is revoked the normal state of the output is restored. During forced operation the brightness value is calculated further; only telegrams *Rel. dimming* are ignored.

For further information see: Communication objects

Setting force operation after bus voltage recovery

Options: inactive (value 0)
             switch off by force (value 2)
             switch on by force (value 3)

Here you switch on which value the object *Forced operation* is assigned with bus voltage recovery.

Enable function *blocking*

Options: no
             yes

The object *Blocking* is enabled here. The function of the object can be blocked here, so that it cannot be changed via the bus.

ABB i-bus® KNX   **Commissioning**

Enable characteristic adjustment

Options: <u>no</u>
             yes

If *yes* is entered in this parameter, the parameter window *A-B: Charact. Adj.* is enabled. In this the dim characteristic, the lighting dependent on the brightness value can be changed.

Select extra function

Options: <u>none</u>
             Slave mode in lighting control
             Staircase lighting function

It is possible to select between two additional functions via this parameter.

- *Slave mode in lighting control:* The device should be controlled by a lighting controller using constant lighting control.

- *Staircase lighting function:* The light is to be switched off or slowly dimmed downwards after a defined time.

ABB i-bus® KNX   **Commissioning**

3.2.4 Parameter window
A-B: Switch

In parameter window *A-B: Switch* you determine how the device reacts on a switch command via the communication object *Switch*.

A-B: Switch	
Switch ON via	100% (255)
Dimming speed from 0...100% while switching, in s [0...65.535]	
while switching off (0 = immediately)	0
while switching on (0 = immediately)	0

Switch ON to

Options: 100 %
              last brightness value
              99 %
              ...
              1 %

If the object *Switch* receives the telegram value 1, the lighting is controlled with the brightness value set here.

The selection with *last brightness value,* restores the brightness level active before the last switch off. If in parameter window *A-B: Dimming* a minimum dimming value has been determined; the lighting will have this as the least possible value.

  For further information see: Parameter window A-B: Dimming

Dimming speed from 0...100 % while switching, in s [0...65,535]
  while switching off
  while switching on

Options: Value from 0...65,535 in seconds

With this setting, the speed used by the lighting for a switch on command or switch off command is set. The time duration applies for the entire dimming range from 0 % to 100 %.

With setting 0 switch on or off is immediate.

Examples
If the parameter is set to the value 10 and the parameter *switch on with* is set to the value 100 %, the device dims when the lighting is switched on within 10 seconds to a brightness of 100 %.
If the lighting is switched off with the current value of 70 %, the device dims the lighting within 7 seconds to the *Minimum dimming value* and then switches it off.

Note
If the staircase lighting function is active the lighting is always switched on immediately. The value set in this parameter in this case is not relevant.

ABB i-bus® KNX   **Commissioning**

3.2.5 Parameter window
A-B: Dimming

In this parameter window the settings for dimming the lighting are undertaken via object *Rel. dimming*.

For further information see: __Communication objects__

A-B: Dimming	
Rel. dimming speed from 0...100% in s [0...65.535]	6
Maximum dimming value	100% (255)
Minimum dimming value	20% (51)
Dimming value apply to Switch, Dimming and staircase lighting function	<--- NOTE
Allow switching on via relative dimming	yes
Allow switching off via rel. dimming	yes
Rel. dimming speed changeable via object (Object: Rel. dimming speed 0...100%)	no

Rel. Dimming speed from 0...100 % in s [0...65,535]

Options: 0...6...65,535

The relative dimming speed, i.e. the dimming ramp is adjustable here. The dimming speed is the time in which the brightness of the lighting is dimmed from 0 % to 100 %.

> **Note**
>
> If very long times are set here, it is possible that with *relative dimming* the brightness will remain at the old value, if the command time is shorter than the time to modify the output brightness by a single dimming step.

Maximum dimming value

Options: 100 %/99 %...51 %/50 %

The maximum dimming value is the largest brightness value that can be controlled with the dimmer via relative dimming. In this way the service life of fluorescent lighting can be extended.

If the brightness value is above the upper dimming value, e.g. by call of a preset or a scene, it is only possible to reduce the brightness.

Minimum dimming value

Options: 50 %/49 %...20 %...1 %/0,3 %

The minimum dimming value is the smallest brightness value, which can be controlled with the dimmer via relative dimming. In this way for example, it is possible to prevent control of brightness ranges in which the fluorescent lighting is already switched off.

The smallest minimum dimming value has a value of 1.

> **Note**
>
> The smallest minimum dimming value should be set here to a value at which the fluorescent lighting can still be operated. Switching of some fluorescent lighting below about 10 % will cause flicker. This should be avoided.

ABB i-bus® KNX   **Commissioning**

Allow switching on via relative dimming

Options: no
          yes

If switching on via relative dimming is permitted, switched off lighting can be switched on by a BRIGHTER dimming telegram.

Allow switching off via rel. dimming

Options: no
          yes

If switching off via relative dimming is permitted, switched on lighting can be switched off by a DARKER dimming telegram. With the parameter value *no* the brightness value remains under the minimum dimming value.

Rel. dimming speed changeable via object (Object: Rel. Dimming speed 0…100 %

Options: no
          yes

This parameter enables the object *Rel. dimming speed 0...100 %*, which allows the dimming speed to be changed.

ABB i-bus® KNX   **Commissioning**

3.2.6   Parameter window
A-B: Value

This function allows the definition of brightness via the 1byte object *Brightness value*.

Dimming speed from 0...100 % while setting brightness, in s [0...65,535]

Options: 0...3...65,535

This parameter determines the speed with which the device dims to a new brightness value. The time which is required to dim from 0...100 % brightness is set.

Maximum brightness value

Options: 100 %/99 %...51 %/50 %

The maximum dimming value is the brightness value that can be controlled with the dimmer via a brightness telegram.

If the dimmer receives a brightness value that is above the maximum dimming value, the output sets the maximum dimming value. This value is reported back on the bus.

Note
The dimming limit defined here applies when brightness values are received as well as for the preset and scene functions.

Minimum brightness value

Options: 50 %/49 %...20 %...1 %/0.3 %

The minimum dimming value is the brightness value that can be controlled with the dimmer via a brightness telegram.

If the dimmer receives a brightness value below the minimum dimming value, the output sets the minimum dimming value (if the received value is not 0).

Note
The dimming limit defined here applies for the preset function, the 8 bit scene as well as in slave mode.

ABB i-bus® KNX
Commissioning

Allow switching on via brightness value

Options: no
              <u>yes</u>

If switching on via brightness value is permitted, switched off lighting can be switched on by a brightness value telegram greater than 0.

Allow switching off via brightness value

Options: no
              <u>yes</u>

If switching off via brightness value is permitted, lighting can be switched off by a brightness value telegram of value 0. Otherwise the lighting remains at the minimum dimming limit.

ABB i-bus® KNX   **Commissioning**

3.2.7   Parameter window
   A-B: Presets

Presets are used to call predefined brightness values via 1-bit telegrams.

Four presets are available per channel. The presets with an even number (2 and 4) are addressed by a telegram with the value 1, the presets with an odd number (1 and 3) are addressed by a telegram with the value 0. Separate objects are available for calling and for saving/setting of a preset brightness value.

With the call of presets the maximum and minimum values as set in the parameter window *A-B: Value* apply. The maximum and minimum values are set with an overshoot or undershoot. At a brightness value of 0, a switch off is always executed, independently of the parameter *Allow switching off via brightness value* in the parameter window *A-B: Value*. The same applies for switch on and the parameter *Allow switching on via brightness value*.

A preset call with active staircase lighting function has no effect on the channel. A preset save command via object *Set preset 1 and 2* is implemented, i.e. at the time as the save command the current brightness value of the channel is saved as a new preset value.

The reaction to a preset call with activated slave operation is parameterised in the parameter window *A-B: Slave*. A preset save command is always executed.

With the call of the preset command, *restore value before first preset call*, the slave mode state is restored.

In the following the functions and the parameters for Preset 1 and 2 are described. Preset 3 and 4 feature the same functions and parameters.

ABB i-bus® KNX   **Commissioning**

Reaction on preset 1 (telegr. value 0)

Options: 100 %/99 %...1 %/0 %
                  restore value before first preset call
                  reset to parameterised value before preset 2

The setting defines how the output reacts with the call of preset 1, i.e. meaning that object *Call preset 1 and 2* receives a telegram with the value 0. A fixed brightness value can be called or a selection made between one of the two following functions:

- *restore value before first preset call:* The state of the channel which existed before the preset was first called will be restored, e.g. if lighting control via slave operation was active, this is also reactivated and executed. If several preset calls have been undertaken consecutively, the state before the first call will be restored. It is irrelevant which numbers the called presets had.

- *reset to parameterised value before preset 2:* Preset 2 resets to the parameterised value as it was before it was changed by the user. This can be advisable if preset 2 can be stored via the bus (see below).

Note
The settings made in this parameter will only be transferred with a download to the Dim actuator if in parameter window *A-B: Functions* the preset enable *Restore presets with standard value during download* has been set to *yes*.

Reaction on preset 2 (telegr. value 1)

Options: 100 %/99 %...1 %/0 %

This setting defines which brightness is controlled with a call of preset 2 (= object *Call preset 1 and 2* receives telegram value 1).

Time to call new brightness value *Transition time* in s [0...65,535]

Options: 0...65,535

This parameter determines the time in which a preset call is dimmed to the new brightness value.

Preset 1 and 2 can be set via the bus

Options: no
             yes

This setting enables the object *Set preset 1 and 2* via the parameter. This saves the currently set brightness value as the new preset value.

Telegram value 0 saves preset 1, whereas a telegram value 1 saves preset 2.

ABB i-bus® KNX   **Commissioning**

**3.2.8   Parameter window
        A-B: Scene(1) to
        A-B: Scene(6)**

The Parameter window *A-B: Scene* is enabled via the Parameter window *A-B: Function*.

Scene function

Using this parameter window, the output is allowed up to 18 different light scene assignments. If a scene number is received via the object *8 bit scene*, the stored scene value (brightness value) is called. Alternatively the possibility exists to store the current brightness value as the new scene value.

With the call of light scenes the maximum and minimum dimming values as set in the parameter window *A-B: Value* apply. The maximum and minimum values are set with an overshoot or undershoot. At brightness value of 0 switch off is always carried out.

Assignment to scene number 1...64

Options: no assignment
              Scene no. 1
              ...
              Scene no. 64

In this parameter the output is assigned to a scene number (1...64). As soon as the device receives a telegram with this scene number on the object *8 bit scene*, it will call the corresponding scene.

Standard brightness value

Options: 100 %/99 %...1 %/0 %

The standard brightness value is the brightness which controls the output as standard with a scene call.

The user can change the set value here. This is implemented by setting a scene. Via the object *Reset 8 bit scene* the value can be reset again to the parameterised value.

ABB i-bus® KNX   **Commissioning**

Time to call new brightness value *Transition time* in s [0...65,535]

Options: 0...3...65,535

The transition time is the time with which the new light scene is set.

Enable more scene assignments

Options: no
                yes

Using this parameter a further parameter window is opened in which the additional scene assignments can be implemented.

ABB i-bus® KNX **Commissioning**

3.2.9 Parameter window A-B: Charact. adj.

The parameter window *A-B: Characteristic adjustment* is enabled via the parameter window *A-B: Function*.

The characteristic adjustment enables the adaption of the dimming characteristic of the lamps to the sensitivity of the eyes.

A-B: Charact. adj.	
Number of value pairs	4
X0 lower sensor value (input)	1
Y0 Adjusted brightness value (output)	1
X1 middle sensor value (input) [2...127]	85
Y1 Adjusted brightness value (output)	85
X2 middle sensor value (input) [128...254]	180
Y2 Adjusted brightness value (output)	180
X3 upper sensor value (input)	255
Y3 Adjusted brightness value (output)	255

Number of value pairs

Options: 2/3/4

Here the number of value pairs which are used in the characteristic curve are set. The curve (characteristic correction) results from a maximum of four value pairs. Between the value pairs a linear interpolated curve (straight) is used.

Accordingly, additional parameters appear with which the individual X/Y values are to be entered to suit the parameterised number of value pairs.

Other parameters:
X…input value
Y… adjusted brightness value (output)

Options: 1…255

The limit and default values of the options are dependent on the number of value pairs.

In accordance with the number of value pairs the X-value and the Y-value can be determined here. The X-value (input value) indicates the value defined by the KNX. The Y-value indicates the "true" brightness value used to control the lamps.

The first X-value is always defined with 1 and the last X-value with 255.

In the parameter window *A-B: Dimming* or *A-B: Value*, parameterised dimming and brightness values are used before the transformation. Through the transformation a setting signal may result for the lamps which is less than or greater than the maximum or minimum brightness values.

The brightness value reported back by the status objects corresponds again for example, with the value defined in the control. A more detailed description and an example can be found in chapter 4.5.

ABB i-bus® KNX   **Commissioning**

3.2.10 Parameter window
A-B: Slave

The Parameter window *A-B: Slave* is enabled via the Parameter window *A-B: Function Select extra function*.

In slave operation, the dimming actuator applies the brightness value that has been defined, for example, by a lighting controller via the object *Brightness value of slave*. Hereby, a channel of the Dim actuator can be integrated into a constant lighting control.

The slave function is activated by a 1 on the *Switch* object. In the parameters it is possible to decide how the slave function can be deactivated If the slave function is inactive the device behaves like a "normal" dimming actuator.

> *For further information see: <u>**Communication objects**</u> or <u>**Slave operation**</u>*

If in the following the object *Switch* or *Brightness value* are mentioned, it also applies for the objects *Switch/Status* or *Brightness value/Status*.

If slave mode is active: reaction on …
** Switching on**
** Relative dimming**
** Brightness value or preset**

Options: no reaction
               Slave mode can be deactivated, execute command

With these three parameters you can set how an output reacts with active lighting control if the following telegrams have been received:

Switch on	Telegram value 1 received on the object *Switch*
Relative dimming	Receipt of a telegram on the object *Rel. dimming*
Brightness value or preset	Receipt of a telegram on the object *Brightness value* or *Call preset*

It is possible to select the reaction for a telegram that is received when slave mode is in operation:

- *no reaction:* The receipt is ignored.

- *Slave mode can be deactivated*: The slave mode is deactivated. It can be reactivated by a switch on telegram.

ABB i-bus® KNX   **Commissioning**

Slave mode after bus voltage recovery

Options: inactive
                <u>active</u>

This selection defines if slave mode is *active* or *inactive* after bus voltage recovery. If the slave function is *active*, the brightness value is recalled after bus voltage recovery.

Note
The parameter *Value of object Switch on bus voltage recovery* in parameter window *A-B: General* has a higher priority than this parameter. If for example, the value 1 is predefined by this parameter, it can always lead to activation of the slave mode after bus voltage recovery.

ABB i-bus® KNX   **Commissioning**

3.2.11 Parameter window A-B: Stairc. fct.

The parameter window *A-B: Staircase function* is enabled via the parameter window *A-B: Function Select extra function*.

Note
With the active staircase light function all the other functions of the device are deactivated with the exception of forced operation.

If telegram value 1 is received on the object *Switch* the lighting is switched on. After the staircase lighting time t_{ON} has elapsed, the lighting dims in an adjustable dimming time t_D to a defined brightness value (basis brightness). If this value is zero, the lighting switches off after the minimum dimming value is reached. The minimum dimming limit from the parameter window *A-B: Dimming* is used.
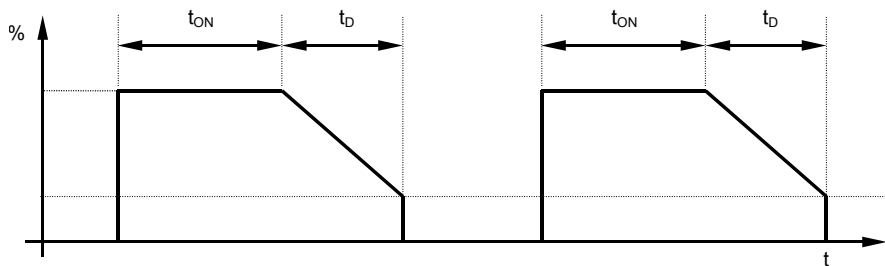
Fig. 1: Brightness behaviour with basis brightness = 0
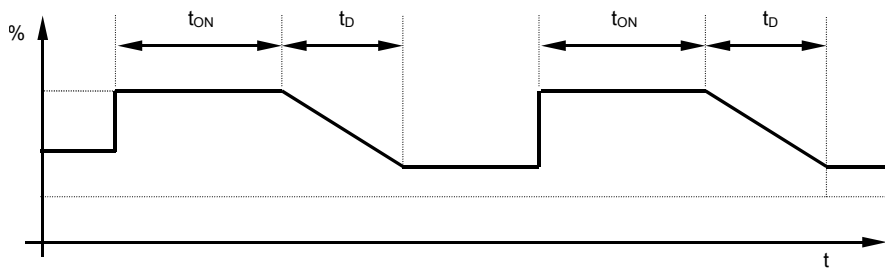
Fig. 2: Brightness behaviour with basis brightness > 0

The staircase lighting function can be deactivated via the object *Activate staircase function* (value 0). Thereafter, the device operates like a "normal" dimming actuator, i.e. all other functions such as relative dimming, brightness value and the scene functions are available in full. For activation of the staircase function a telegram with the value 1 must be sent.

With switched on staircase lighting the maximum and minimum dimming values, as defined in parameter window *A-B: Dimming* apply. The respective parameterized values are set with overshoot or undershoot.

Reaction after bus voltage failure

After a bus voltage failure the staircase lighting function is always activated and the lighting state remains unchanged:

- If the lighting was switched on, the switch on brightness is set and the staircase lighting time is restarted.

ABB i-bus® KNX   **Commissioning**

- If the lighting was switched off, it remains off.

Behaviour after download

After download the staircase lighting function is not active. It must be activated via the object *Activate staircase function*.

*For further information see: **Communication objects***

A-B: Stairc. fct.	
Brightness value after switching on	100% (255)
Time duration in sec [0...65.535]	180
After staircase time dimming to base brightness	0% (0)
Time for dimming down in s [0...65.535]	60
Extending staircase lighting by multiple operation ("pumping up")	yes (retriggerable)
Reaction on switching off via object "switch"	no reaction
Brightness value during permanent ON	100% (255)
Restart of staircase time after end of permanent ON	yes
Warning during dimming down (object "Warning stairc. lighting")	yes

Brightness value after switching on

Options: 100 %/99 %...1 %/0 % (OFF)

This parameter defines the brightness of the lighting during the staircase lighting time. If the brightness value is less than the minimum dimming value, the minimum dimming value is set.

Time duration in s [0...65,535]

Here the time period is defined in which the staircase lighting is switched on (staircase lighting time t_{ON}).

After staircase time dimming to base brightness

Options: 100 %/99 %...1 %/0 % (OFF)

The base brightness which is permanently controlled is set here, e.g. with night time lighting. In normal mode this brightness is not undershot.

Time for dimming down in s [0...65,535]

The dimming time t_D defines the speed used for dimming down at the end of the staircase lighting time.

Extending staircase lighting by multiple operation (pumping)

Options: no (not retriggerable)
                  yes (retriggerable)
                  up to max. 2x staircase lighting time
                  ...
                  up to max. 5x staircase lighting time

With the retriggerable setting the staircase lighting time can be extended by a further staircase lighting time when a switch on telegram is received. The maximum time can also be set using this parameter.

ABB i-bus® KNX   **Commissioning**

Reaction on switching off via object *Switch*

Options: <u>no reaction</u>
             switch on basis brightness
             dimming on basis brightness
             switch off

- *no reaction:* Switch off telegrams are ignored.

- *switch on basis brightness:* The lighting dims to the basis brightness level which has been set beforehand.

- *dimming on basis brightness:* The dimming time is started with switched on lighting.

- *switch off:* The lighting is switched off.

If permanent ON is active the switch off telegram is ignored.

Brightness value during permanent ON

Options: <u>100 %</u>/99 %/.../1 %/0 % (OFF)

Here you can set the brightness of the lighting (0…100 %), which is used when object *Permanent ON* has the value 1.

Restart of staircase time after end of permanent ON

Options: no (dim down immediately)
             <u>yes</u>

- *no (dim down immediately):* The lighting switches to basis brightness when the permanent lighting has ended.

- *yes:* The lighting remains on and the staircase lighting time restarts.

Warning during dimming down (object *Warning stairc. lighting*)

The user can be additionally warned during the dimming time that the staircase lighting time is timing out, by setting the object *Warning staircase lighting* to 1. Thus for example, a pushbutton LED can be controlled which informs the user about the impending staircase lighting switch off.

ABB i-bus® KNX   **Commissioning**

3.3 Communication objects

General objects

No.	Function	Object name	Data type	Flags
0	**In Operation**	**General**	**1 Bit** **DPT 1.002**	**C, R, T**
Cyclically sends the object value 0 or 1 on the bus. Object value and cycle time can be set in the parameters. The telegram can be used to monitor the life signs of the device, e.g. via a monitoring module.				
1	**Excess temperature**	**General**	**1 Bit** **DPT 1.005**	**C, R, T**
Indicates that the device is internally subject to overtemperature. In this case the maximum output power per channel is limited to 1 A.				
2	**Critical excess temperature**	**General**	**1 Bit** **DPT 1.005**	**C, R, T**
Indicates that the device is internally subject to critical overtemperature. In this case the lighting is switched off.				
10 **35**	**Switch**	**Output A** **Output B**	**1 Bit** **DPT 1.001**	**C, W, T**
Switches the lighting on or off 0: Switch off command 1: Switch on command				
11 **36**	**Status Switch**	**Output A** **Output B**	**1 Bit** **DPT 1.001**	**C, R, T**
Used for feedback of the current switching state. The object value can be inverted (see parameter). 0: Lighting is off (brightness value is zero) 1: Lighting is not off (brightness value not equal to zero) or lighting dims				
12 **37**	**Relative dimming**	**Output A** **Output B**	**4 Bit** **DPT 3.007**	**C, W**
The dim commands (BRIGHTER, DARKER, STOP) are received via this object. This object has no function with active staircase lighting function.				
13 **38**	**Brightness value**	**Output A** **Output B**	**1 Byte** **DPT 5.001**	**C, W, T**
Defines a brightness value for the output. The brightness value can be dimmed or immediately applied. This object has no function with active staircase lighting function.				
14 **39**	**Status brightness value**	**Output A** **Output B**	**1 Byte** **DPT 5.001**	**C, R, T**
Used for feedback of the current brightness value which is output. The object value updates only at the completion of a switching or dimming process.				
15 **40**	**Rel. dimming speed 0…100 %**	**Output A** **Output B**	**2 Byte** **DPT 7.005**	**C, R, W**
This object is visible if in parameter window *A-B: Dimming* the parameter *Rel. Dimming speed* changeable is selected via object Rel. *Dimming speed 0...100%* Via this object the dimming speed for relative dimming can be set. The time is set in which the relative dimming ramp operates from 0 to 100 % (dim up) or from 100 % to 0 % (dim down). The value (counter value) is represented in seconds. The object value is set by the parameterised value after bus voltage recovery. A value set via the bus beforehand is overwritten and is lost .				

ABB i-bus® KNX   **Commissioning**

No.	Function	Object name	Data type	Flags
16 **41**	**Forced operation**	**Output A** **Output B**	**2 Bit** **DPT 2.001**	**C, W**

This object serves for defining a parameterised brightness value with subsequent blocking of the operation.

After download the object has the value 0.

0: Remove forced operation
1: Remove forced operation
2: Switch off by force
3: Switch on by force

Objects of the function *Preset*

No.	Function	Object name	Data type	Flags
17/19 **42/44**	**Call preset 1 and 2 *and*** **Call preset 3 and 4**	**Output A** **Output B**	**1 Bit** **DPT 1.022**	**C, W**

Calls a parameterised brightness value.

0: Call preset 1 or preset 3
1: Call preset 2 or preset 4

This object has no function with active staircase lighting function.

No.	Function	Object name	Data type	Flags
18/20 **43/45**	**Set preset 1 and 2 *and*** **Set preset 3 and 4**	**Output A** **Output B**	**1 Bit** **DPT 1.022**	**C, W**

Saves the currently set brightness value as the new preset value.

0: Set preset 1 or preset 3
1: Set preset 2 or preset 4

Objects of the function *8 bit scene*

No.	Function	Object name	Data type	Flags
21 **46**	**8 bit scene**	**Output A** **Output B**	**1 Byte** **DPT 18.001**	**C, W**

This object is visible if in parameter window *A-B: Function* the *8 bit scene* function is enabled. Using this 8 bit communication object a scene command can be sent using a coded telegram, which integrates the output of the Switch/Dim actuator in a KNX scene. The telegram contains the number of the respective scene as well as the information if the scene is to be retrieved, or if the current brightness value is to be assigned to the scene.

KNX telegram value		Meaning
Decimal	**Hexadecimal**	
00	00h	Call scene 1
01	01h	Call scene 2
02	02h	Call scene 3
...	...	...
63	3Fh	Call scene 64
128	80h	Set scene 1
129	81h	Set scene 2
130	82h	Set scene 3
...	...	...
191	AFh	Set scene 64

Other figure values have no effect.

This object has no function with the active staircase lighting function or slave operation.

ABB i-bus® KNX   **Commissioning**

No.	Function	Object name	Data type	Flags
22 **47**	**Restore standard scene**	**Output A** **Output B**	**1 Bit** **DPT 1.015**	**C, W**

The standard brightness values of an 8 bit scene are defined in the parameters (parameter window *A-B: Scene*) They can be modified by the user during operation.

A telegram with the value 1 on this object resets all scene values to the standard values set in the parameters.

0: no reaction
1: Overwrite scene values with standard value

Objects of the function *Block*

No.	Function	Object name	Data type	Flags
23 **48**	**Block**	**Output A** **Output B**	**1 Bit** **DPT 1.003**	**C, W**

Used for blocking an output to prevent unwanted operation. The lighting remains unchanged when a block is removed.

After bus voltage recovery or download the blocking is removed.

0: Blocking removed
1: Block active

With active staircase lighting function the lighting level is kept at the present level if the object *Warning stairc. lighting* is not yet active. The staircase lighting function times out after the block has been removed.

If the object *Warning stairc. lighting* is active, the staircase lighting function times out.

Objects of function *Slave mode in lighting control*

No.	Function	Object name	Data type	Flags
24 **49**	**Activate slave operation**	**Output A** **Output B**	**1 Bit** **DPT 1.003**	**C, W**

Used for activation/deactivation of slave operation. With deactivation the device behaves like a "normal" Dim actuator without slave function. The slave operation can be reactivated when this object receives the value 1.

By setting the T flag the object is actively sent after bus voltage recovery.

0: Deactivate slave function
1: Activate slave function

No.	Function	Object name	Data type	Flags
25 **50**	**Brightness value of slave**	**Output A** **Output B**	**1 Byte** **DPT 5.001**	**C, R, W**

Via this object the Dim actuator receives the brightness value from a higher level light control (master).

Objects of the function *Staircase function*

No.	Function	Object name	Data type	Flags
24 **49**	**Activate staircase function**	**Output A** **Output B**	**1 Bit** **DPT 1.003**	**C, W**

The staircase function can be deactivated via this object. Then the device behaves like a "normal" Dim actuator without staircase lighting function. The staircase function can be reactivated when this object receives the value 1.

After bus voltage recovery the staircase lighting function is always activated. By setting the T flag the object is actively sent after bus voltage recovery.

0: Deactivate
1: Activate

No.	Function	Object name	Data type	Flags
25 50	**Permanent ON**	**Output A** **Output B**	**1 Bit** **DPT 1.001**	**C, W, T**

Serves as an active staircase light control for permanent switch on of the lighting (also called "Service light").

After bus voltage recovery or download the object value is set to 0.

0: Permanent light not active
1: Permanent light active

No.	Function	Object name	Data type	Flags
26 51	**Duration of staircase lighting**	**Output A** **Output B**	**2 Byte** **DPT 7.005**	**C, R, W**

Modifies the duration of staircase lighting (in seconds).

The object value is reset to the standard value after bus voltage recovery, as defined in the parameters.

No.	Function	Object name	Data type	Flags
27 52	**Warning staircase lighting**	**Output A** **Output B**	**1 Bit** **DPT 1.005**	**C, T**

Used to provide a warning before the staircase lighting time times out. The object has the value 1 during the warning time, otherwise it has the value 0.

Objects for diagnostics

No.	Function	Object name	Data type	Flags
32 57	**Load type**	**Output A** **Output B**	**1 Bit** **Non DPT**	**C, R, T**

These objects provide information about the load type the device is currently controlling.

0: The device controls a capacitive load (inverse phase control mode)
1: The device controls an inductive load (phase angle control mode)

On a malfunction this object indicates the load type which was controlled last. The object value is sent when a change occurs. On a fault, e.g. if the load type could not be detected, the object type may be invalid. In this case the object value is 0.

Note: If the load is removed in operation, the value of this object is set to 1 until the load is reconnected.

No.	Function	Object name	Data type	Flags
33 58	**Error message**	**Output A** **Output B**	**1 Bit** **DPT 1.005**	**C, R, T**

This object signals a general fault. It has the value 1, if in object *Status byte* one of the bits 3...7 is set. The object value is sent with a change and with bus voltage recovery.

No.	Function	Object name	Data type	Flags
34 59	**Status byte**	**Output A** **Output B**	**1 Byte** **Non DPT**	**C, R, T**

This object is useful particularly if the device does not function as required. It indicates the possible causes:

Bit 0: Additional function (staircase light or slave operation) is active
Bit 1: Blocking function is active
Bit 2: Forced operation is active
Bit 3: Error with load detection or load type incorrectly set
Bit 4: Undervoltage of the mains supply
Bit 5: Load side overcurrent/short circuit
Bit 6: Load side underload/no-load
Bit 7: Load side overvoltage/overcurrent pulse

The object value is sent on a change and reset automatically, e.g. after a switch on command when the cause of the fault has been remedied.

ABB i-bus® KNX   **Planning and application**

4   Planning and application

In this section you will find some tips and application examples for practical use of the device.

4.1   Interdependence of the functions

The functions have the dependence to one another:

| Forced operation |

| Block output |

| Other function |

| Normal operation |

Highest priority

Lowest priority

ABB i-bus® KNX   **Planning and application**
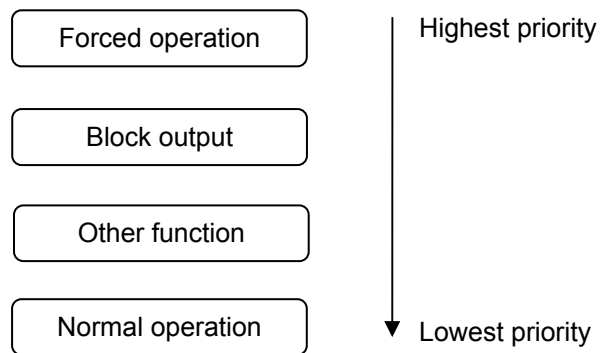
4.2   Staircase lighting time

With the active staircase light function the other functions of the device are deactivated, with the exception of forced operation and block function.

When the telegram value 1 is received on the object *Switch*, the lighting is switched on. After the staircase lighting time t_{ON} has elapsed, the lighting dims in an adjustable dimming time t_D to a defined brightness value (basis brightness). If this value is zero, the lighting switches off after the minimum dimming value is reached. Then parameterised dimming values in the parameter window *A-B: Dimming* apply.

Note
During an activated staircase lighting function the preset and scene commands have no effect.

After bus voltage recovery the staircase lighting function is activated. The lighting state remains unchanged:

- If the lighting was switched on, the switch on brightness is set and the lighting is restarted.

- If the lighting was switched off, the brightness switches to the basis brightness.

The dimming time T_D relates to the minimum dimming value or the basis brightness, depending on the value that is reached first. Using this logic the light is always dimmed for the entire prewarn time T_D, in order to provide a sufficiently long warning before the staircase light is switched off.
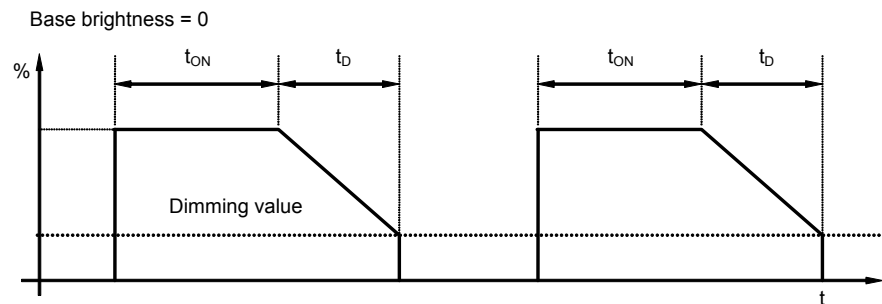
Fig. 37: Brightness behaviour with basis brightness = 0
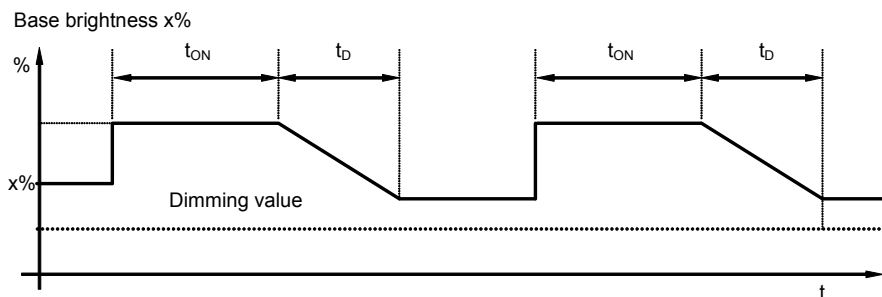
Fig. 18: Brightness behaviour with basis brightness not equal to 0

A telegram with the value 0 which is received by the object *Activate staircase function* deactivates the staircase function. Thereafter the device operates like a "normal" dimming actuator, i.e. all other functions such as relative dimming, setting of a brightness value and the scene and preset

ABB i-bus® KNX   **Planning and application**

functions can be fully used again. For renewed activation of the staircase function a telegram with the value 1 must be received on the object.

With switched on staircase lighting the maximum and minimum dimming values, as defined in parameter window *A-B: Dimming* apply. The respective parameterized values are set with overshoot or undershoot.

Retriggering
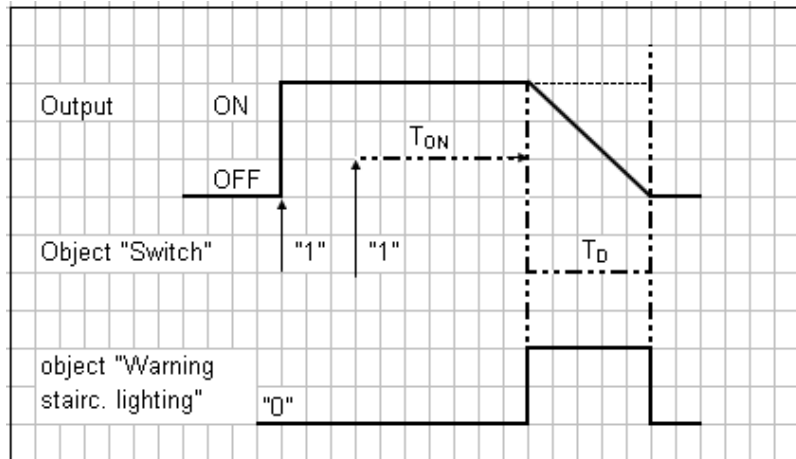
Fig. 19:   Diagram staircase lighting time

After the staircase lighting time T_{ON} the output switches off automatically. With each telegram 1 the time restarts (retrigger function), if the parameter *Extending staircase lighting by multiple operation (pumping up)* is set to *yes* in the parameter window *A-B: Staircase lighting (retriggerable)*.

In this example, a dimming with the corresponding prewarning is parameterised. The prewarning is visualised by the dimming. At the same time, the object *Warning staircase lighting* can be switched as a project-specific warning (e.g. optical or acoustic warning).

Pumping

With pumping, the user can adapt the staircase lighting time to the current requirements by pressing the push button several times in succession. The maximum duration of the staircase lighting time can be set in the parameters.
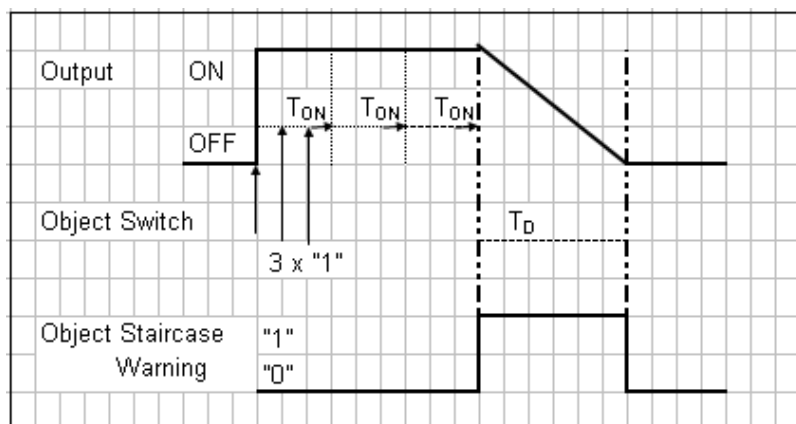
Fig. 20:   Diagram staircase lighting time pumping

If the device receives a further ON command when the staircase lighting is switched on, the staircase lighting time is added to the remaining period. The dimming T_D (warning time) is not changed by pumping and is added to the extended (x times T_{ON}) staircase lighting time.

ABB i-bus® KNX   **Planning and application**

4.3   Preset description

A switching state that can be parameterised can be retrieved with the help of presets. Light scenes can therefore be implemented for example with a 1-bit object.

Retrieve preset
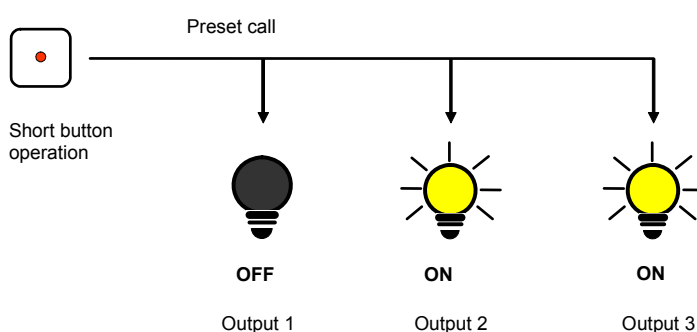
Fig. 21:   Controlling light scenes via presets

Switch states (*preset values*) can be retrieved via the object *Call preset 1 and 2*. A maximum of 4 preset values are available for each output:

Action	Telegram
Call preset 1	Object *Call preset 1 and 2* = 0
Call preset 2	Object *Call preset 1 and 2* = 1

Table 18   Retrieve preset objects

Store preset
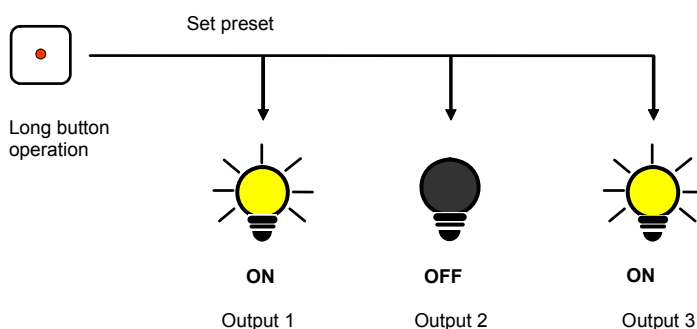
Fig. 22:   **Storing the current output state as the new preset value**

The current switching state is stored as a new preset value via the object *Set preset 1 and 2*. The user can thus adapt a lightscene for example. The presets are stored via the following values:

Action	Telegram
Save preset 1	Object *Set Preset 1 and 2* = 0
Save preset 2	Object *Set Preset 1 and 2* = 1

Table 19   Store preset objects

The reaction is similar for preset 3 and 4 with the objects *Set preset 3 and 4* and *Call preset 3 and 4.*

ABB i-bus® KNX   **Planning and application**

Special function: Restore state

A useful special function can also be assigned to Preset 1. This is used to recreate the brightness level (states) which was present before retrieving the first preset call. The call can be implemented via Preset 2, 3 or 4. The following diagram clarifies this:
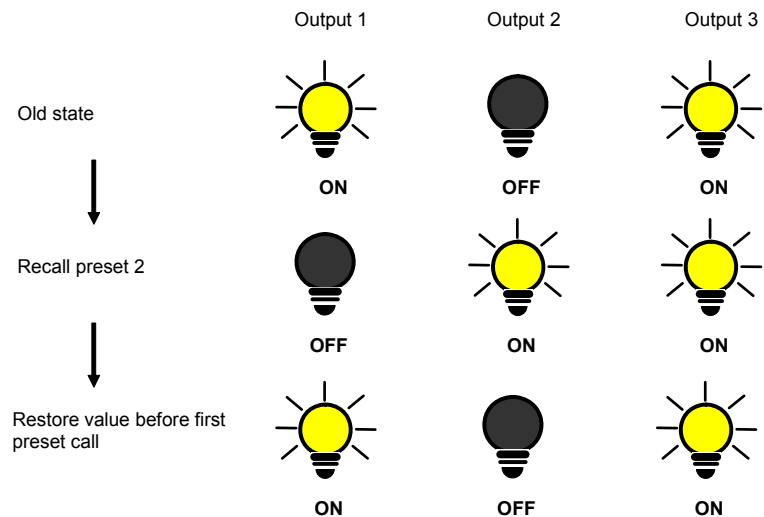
Fig. 23:   Restoring the old brightness state (example)

This function can be used for example after a presentation to restore the lighting to the state it was in beforehand.

With the first call of a preset the current state of the channel is stored. If a preset was already active the saved state will not be overwritten. This ensures that the state before the first preset call can be re-established. If the preset is called more often, the state of the first call applies.

After the command *Restore value before first preset call* has been called, the new state will be stored with the next preset call. It can thus be restored at a later time.

The reaction is similar for preset 3 and 4 with the objects *Set preset 3 and 4* and *Call preset 3 and 4.*

ABB i-bus® KNX   **Planning and application**

4.4   8 bit scene

With the 8 bit scene, e.g. a pushbutton or a visualisation with an 8 bit telegram, the system receives an instruction to set/call a scene. The information (brightness value and transition time) are not stored in the pushbutton, but rather in the Dim actuator and the other ABB i-bus® devices in the system. All scene devices, such as a channel of the Dim actuator, are addressed by the same group address. It is sufficient to send a single telegram to call the scene with all outputs involved.
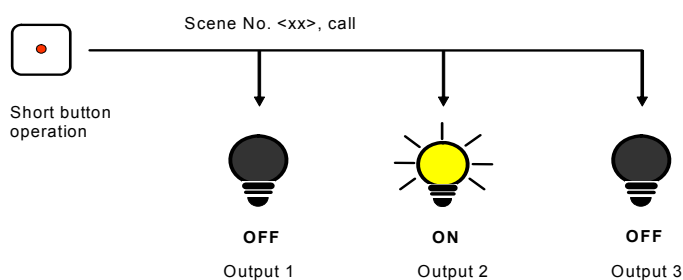
Fig. 24:   Retrieve scene, 8 bit scene

In the 8 bit telegram value the scene number is contained which must match the scene number in the parameters of the Dim actuator.

Up to 64 different scenes are managed via a single group address. The 8 bit scene telegram contains the *Retrieval* and *Storing functions of a scene*.

In the following the 8 bit scene function is described which controls multiple KNX devices.

With the 8 bit scene it is possible to retrieve one of 64 scenes or to connect multiple KNX devices in an 8 bit scene, e.g. shutter, switch actuator and DALI gateways or Dim actuators. The scene can be retrieved or stored using a single 1-byte telegram. The precondition is that all operating devices or channels are parameterised with the same scene number.

Each KNX device involved receives the 8 bit scene telegram and independently controls the scenes values. For example, the outputs are switched on or off via the Dim actuator, the shutters actuator moves the shutters to a defined position or the DALI gateway dims its output to the pre-programmed brightness values.

Up to 64 different scenes can be managed via a single KNX group address. An 8 bit scene telegram contains the following information.

– Number of the scene (1…64)
– Retrieve scene/store scene

For further information see: Status byte table

ABB i-bus® KNX **Planning and application**
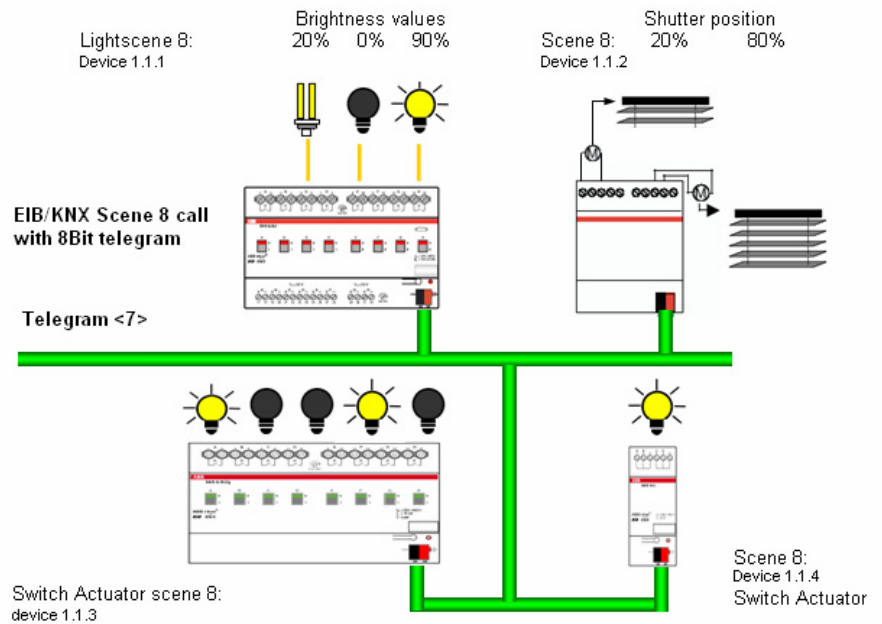
Fig. 25: 8 bit scene example: Retrieve scene No. 8

Example
A KNX 8 bit scene (No. 8) comprises of some lamps, which are connected to two Switch actuators and a Dim actuator. Furthermore, two shutters are integrated into the scene via a shutter actuator. The scene can be retrieved via a single KNX telegram. The prerequisite for this is that all devices have programmed scene 8 accordingly in the devices. After a telegram has been received, the slave switches on its scene number 8. The shutter actuator moves the shutters to the corresponding position, the lighting assumes the predefined brightness values and switching states defined by the scene.

Benefit
The 8 bit scene offers some advantages compared to conventional scene programming via several KNX groups. On the one hand only a single telegram which is received by all participants in the scene and implemented accordingly, is sent on the bus to retrieve a scene. On the other hand, the target positions of the shutter, the contact position of the switch actuator outputs and the brightness of the Dim actuators are stored in the participating devices and do not need to be sent via the KNX each time they are to be retrieved.

Note
The scene numbering 1 to 64 is retrieved via the KNX with a telegram number 0 to 63.
For further information see: Status byte table

ABB i-bus® KNX   **Planning and application**

4.5   Characteristic adjustment

Sometimes it is necessary to adjust the dimming characteristic of a light to the sensitivity of the human eye. This can be undertaken with a characteristic adjustment. Normally the object value 0...255 is assigned with the proportional brightness value 0 %...100 %, see normal characteristic in the illustration.
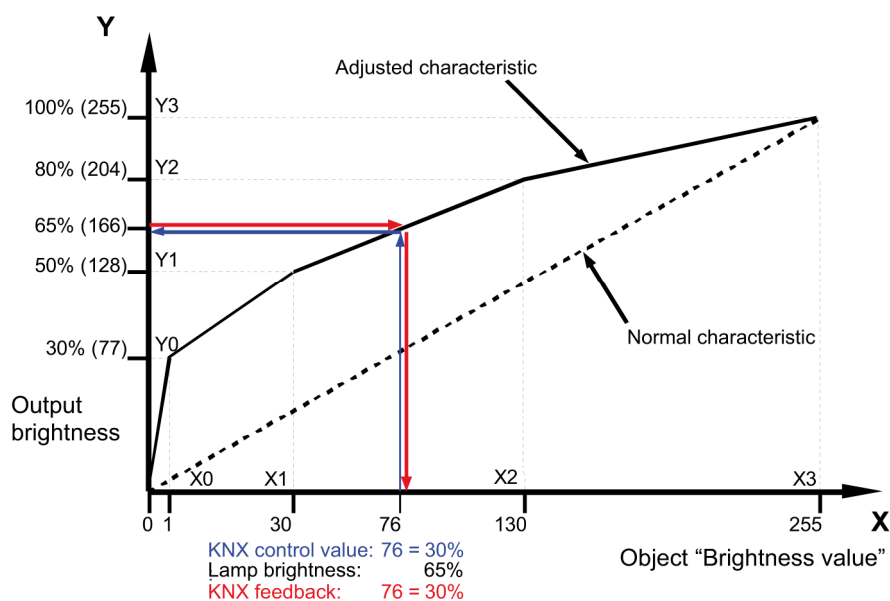
This curve can be converted by 4 value pairs to an adjusted curve. A liner interpolation of the characteristic is undertaken between the value pairs.

If the lights should be brighter in the lower range, the brightness can be increased or reduced with the object value 1. In the upper example, in the first value pair the brightness for value 1 has therefore been defined at 30 %. The other value pairs in the example have been defined so that they result in a curve that has a flatter progression in the upper range.

With relative dimming a flatter dimming ramp is thus achieved. In extreme cases the brightness characteristic can even be inverted:

$X0 = 1 \rightarrow Y0 = 255$ (100 %) and $X1 = 255 \rightarrow Y1 = 1$ (0.3 %)

In this case, the maximum control value 255 sets the minimum brightness value of 0.3 % and the minimum control value sets the maximum brightness value of 100 %.

The feedback brightness values received via object *Status brightness value* or *Brightness/Status* also take the curve into consideration, i.e. a control variable of 76 (30 %) is transformed to a brightness of 65 % to control the lighting. The lighting feeds back 65 %. This value is transformed once again to 76 (30 %) and provided as a brightness value in the KNX. In this way, a constant lighting control of a lighting controller is possible to operate without difficulties, as the control value and the feedback directly correspond and a correct control factor can be calculated.

ABB i-bus® KNX   **Planning and application**

Note
In the parameter window *A-B: Dimming* or *A-B: Value*, parameterised dimming and/or brightness values are used before the transformation. Through the transformation a setting signal may result for the lamps which is therefore less than or greater than the maximum or minimum brightness values.

ABB i-bus® KNX   **Planning and application**

4.6   Slave operation

The reaction to the switch on telegram with the object *Switch* can be parameterised. If the slave operation is activated, the Dim actuator strictly adheres to the brightness value, which is predefined by the object *Brightness value of slave*. Brightness values on the object *Brightness value* are ignored. A telegram with the value 0 on the object *Activate slave mode* deactivates slave mode. A telegram with the value 1 switches on slave operation again. This activation or deactivation is also displayed in the first bit of the status byte.

A switch off telegram 0 on the object *Switch*, has the effect that the slave mode is deactivated for some time. In this case, the slave mode is in a latent state and waits in the background for renewed activation. A renewed activation can be implemented by an ON command, a telegram with the value 1 to the object *Switch* or via the object *Activate slave mode*. As in the latent state, the slave mode continues to be active in the background and is waiting for activation, the first bit in the status byte will always indicate the activated slave mode with the value 1.

The same behaviour results when in the parameter window *A-B: Slave*, it is defined that a dim, switch, value command, preset or scene call interrupts slave operation. During this interruption the slave mode is also latent. The slave operation can be reactivated via an ON command or a telegram with the value 1 to the object *Switch* or via the object *Activate slave mode*.

The parameterisation *no reaction* has the effect that no dim, switch and value command can be executed. Also a preset or scene call and storing of a scene has no effect. However, using the object *Set preset* a new brightness value for a preset can be saved.

In the parameter window *A-B: Value* the parameterised value limits also apply for the slave operation. The undershoot and overshoot of these limits are set using the parameterised minimum or maximum brightness value. If the master sends the brightness value 0 the lighting is switched off.

The behaviour of the slave mode after bus voltage recovery can be parameterised.

ABB i-bus® KNX   **Appendix**

5   Appendix

5.1   Table of the status bytes

Priority control is active means that the channel is forcibly switched on or off via the forced operation (Object *Forced operation*).

Blocking function is active means that the channel is blocked for all operation via the blocking function (Object *Blocking*).

Staircase lighting function or *slave function is active* means that one of these additional functions is active and therefore certain operating functions are inhibited.

ABB i-bus® KNX   **Appendix**

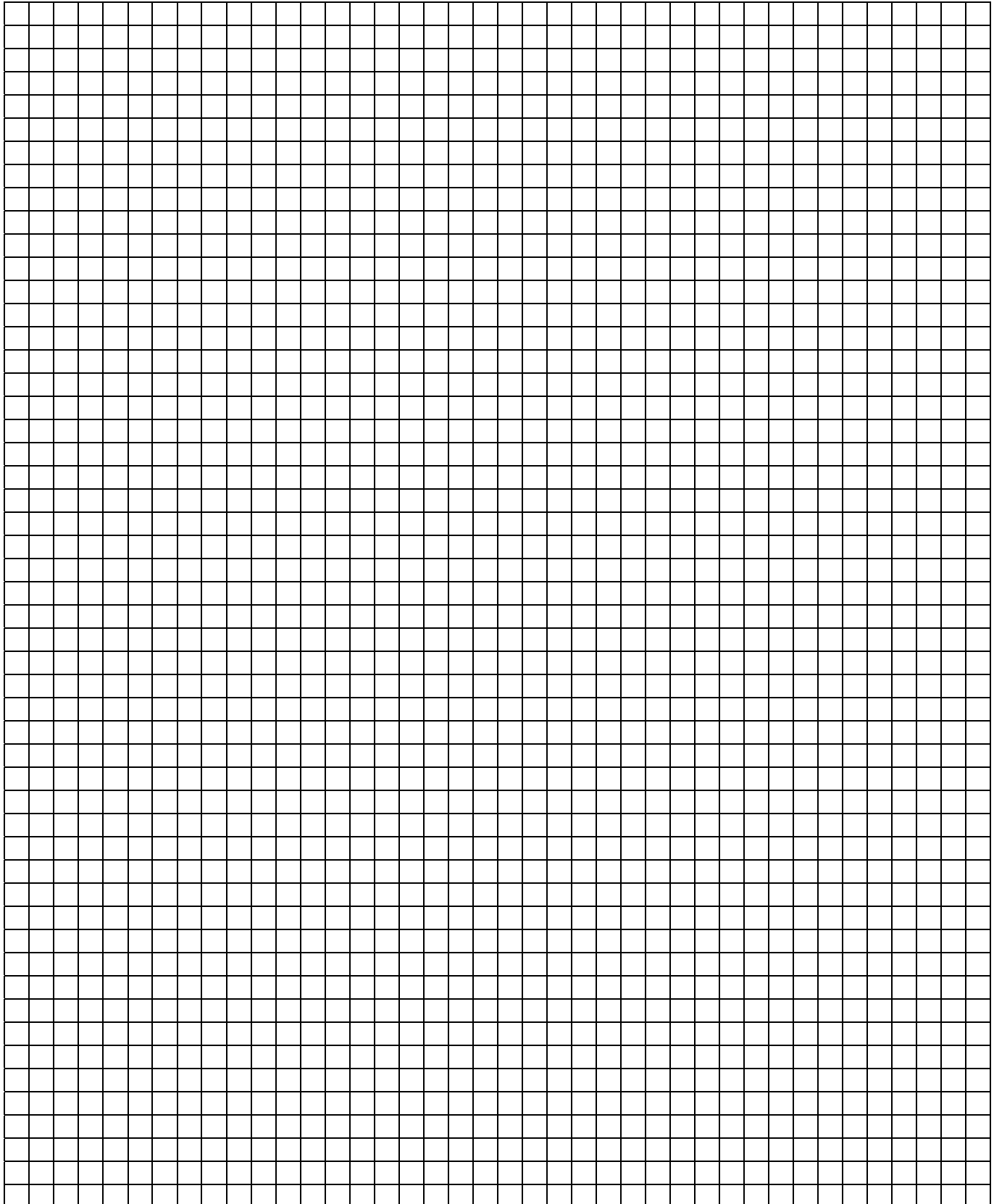| Dec	Hex	Overvoltage / overcurrent pulse	Underload/ no-load	Overload/short circuit current	Undervoltage in mains	Error load detection /	Forced operation is active	Blocking function is active	Extra function is active
0	00								
1	01								■
2	02							■	
3	03							■	■
4	04						■		
5	05						■		■
6	06						■	■	
7	07						■	■	■
8	08					■			
9	09					■			■
10	0A					■		■	
11	0B					■		■	■
12	0C					■	■		
13	0D					■	■		■
14	0E					■	■	■	
15	0F					■	■	■	■
16	10				■				
17	11				■				■
18	12				■			■	
19	13				■			■	■
20	14				■		■		
21	15				■		■		■
22	16				■		■	■	
23	17				■		■	■	■
24	18				■	■			
25	19				■	■			■
26	1A				■	■		■	
27	1B				■	■		■	■
28	1C				■	■	■		
29	1D				■	■	■		■
30	1E				■	■	■	■	
31	1F				■	■	■	■	■
32	20			■					
33	21			■					■
34	22			■				■	
35	23			■				■	■
36	24			■			■		
37	25			■			■		■
38	26			■			■	■	
39	27			■			■	■	■
40	28			■		■			
41	29			■		■			■
42	2A			■		■		■	
43	2B			■		■		■	■
44	2C			■		■	■		
45	2D			■		■	■		■
46	2E			■		■	■	■	
47	2F			■		■	■	■	■
48	30			■	■				
49	31			■	■				■
50	32			■	■			■	
51	33			■	■			■	■
52	34			■	■		■		
53	35			■	■		■		■
54	36			■	■		■	■	
55	37			■	■		■	■	■
56	38			■	■	■			
57	39			■	■	■			■
58	3A			■	■	■		■	
59	3B			■	■	■		■	■
60	3C			■	■	■	■		
61	3D			■	■	■	■		■
62	3E			■	■	■	■	■	
63	3F			■	■	■	■	■	■
64	40		■						
65	41		■						■
66	42		■					■	
67	43		■					■	■
68	44		■				■		
69	45		■				■		■
70	46		■				■	■	
71	47		■				■	■	■
72	48		■			■			
73	49		■			■			■
74	4A		■			■		■	
75	4B		■			■		■	■
76	4C		■			■	■		
77	4D		■			■	■		■
78	4E		■			■	■	■	
79	4F		■			■	■	■	■
80	50		■		■				
81	51		■		■				■
82	52		■		■			■	
83	53		■		■			■	■
84	54		■		■		■		
85	55		■		■		■		■
86	56		■		■		■	■	
87	57		■		■		■	■	■
88	58		■		■	■			
89	59		■		■	■			■
90	5A		■		■	■		■	
91	5B		■		■	■		■	■
92	5C		■		■	■	■		
93	5D		■		■	■	■		■
94	5E		■		■	■	■	■	
95	5F		■		■	■	■	■	■
96	60		■	■					
97	61		■	■					■
98	62		■	■				■	
99	63		■	■				■	■
100	64		■	■			■		
101	65		■	■			■		■
102	66		■	■			■	■	
103	67		■	■			■	■	■
104	68		■	■		■			
105	69		■	■		■			■
106	6A		■	■		■		■	
107	6B		■	■		■		■	■
108	6C		■	■		■	■		
109	6D		■	■		■	■		■
110	6E		■	■		■	■	■	
111	6F		■	■		■	■	■	■
112	70		■	■	■				
113	71		■	■	■				■
114	72		■	■	■			■	
115	73		■	■	■			■	■
116	74		■	■	■		■		
117	75		■	■	■		■		■
118	76		■	■	■		■	■	
119	77		■	■	■		■	■	■
120	78		■	■	■	■			
121	79		■	■	■	■			■
122	7A		■	■	■	■		■	
123	7B		■	■	■	■		■	■
124	7C		■	■	■	■	■		
125	7D		■	■	■	■	■		■
126	7E		■	■	■	■	■	■	
127	7F		■	■	■	■	■	■	■
128	80	■							
129	81	■							■
130	82	■						■	
131	83	■						■	■
132	84	■					■		
133	85	■					■		■
134	86	■					■	■	
135	87	■					■	■	■
136	88	■				■			
137	89	■				■			■
138	8A	■				■		■	
139	8B	■				■		■	■
140	8C	■				■	■		
141	8D	■				■	■		■
142	8E	■				■	■	■	
143	8F	■				■	■	■	■
144	90	■			■				
145	91	■			■				■
146	92	■			■			■	
147	93	■			■			■	■
148	94	■			■		■		
149	95	■			■		■		■
150	96	■			■		■	■	
151	97	■			■		■	■	■
152	98	■			■	■			
153	99	■			■	■			■
154	9A	■			■	■		■	
155	9B	■			■	■		■	■
156	9C	■			■	■	■		
157	9D	■			■	■	■		■
158	9E	■			■	■	■	■	
159	9F	■			■	■	■	■	■
160	A0	■		■					
161	A1	■		■					■
162	A2	■		■				■	
163	A3	■		■				■	■
164	A4	■		■			■		
165	A5	■		■			■		■
166	A6	■		■			■	■	
167	A7	■		■			■	■	■
168	A8	■		■		■			
169	A9	■		■		■			■
170	AA	■		■		■		■	
171	AB	■		■		■		■	■
172	AC	■		■		■	■		
173	AD	■		■		■	■		■
174	AE	■		■		■	■	■	
175	AF	■		■		■	■	■	■
176	B0	■		■	■				
177	B1	■		■	■				■
178	B2	■		■	■			■	
179	B3	■		■	■			■	■
180	B4	■		■	■		■		
181	B5	■		■	■		■		■
182	B6	■		■	■		■	■	
183	B7	■		■	■		■	■	■
184	B8	■		■	■	■			
185	B9	■		■	■	■			■
186	BA	■		■	■	■		■	
187	BB	■		■	■	■		■	■
188	BC	■		■	■	■	■		
189	BD	■		■	■	■	■		■
190	BE	■		■	■	■	■	■	
191	BF	■		■	■	■	■	■	■
192	C0	■	■						
193	C1	■	■						■
194	C2	■	■					■	
195	C3	■	■					■	■
196	C4	■	■				■		
197	C5	■	■				■		■
198	C6	■	■				■	■	
199	C7	■	■				■	■	■
200	C8	■	■			■			
201	C9	■	■			■			■
202	CA	■	■			■		■	
203	CB	■	■			■		■	■
204	CC	■	■			■	■		
205	CD	■	■			■	■		■
206	CE	■	■			■	■	■	
207	CF	■	■			■	■	■	■
208	D0	■	■		■				
209	D1	■	■		■				■
210	D2	■	■		■			■	
211	D3	■	■		■			■	■
212	D4	■	■		■		■		
213	D5	■	■		■		■		■
214	D6	■	■		■		■	■	
215	D7	■	■		■		■	■	■
216	D8	■	■		■	■			
217	D9	■	■		■	■			■
218	DA	■	■		■	■		■	
219	DB	■	■		■	■		■	■
220	DC	■	■		■	■	■		
221	DD	■	■		■	■	■		■
222	DE	■	■		■	■	■	■	
223	DF	■	■		■	■	■	■	■
224	E0	■	■	■					
225	E1	■	■	■					■
226	E2	■	■	■				■	
227	E3	■	■	■				■	■
228	E4	■	■	■			■		
229	E5	■	■	■			■		■
230	E6	■	■	■			■	■	
231	E7	■	■	■			■	■	■
232	E8	■	■	■		■			
233	E9	■	■	■		■			■
234	EA	■	■	■		■		■	
235	EB	■	■	■		■		■	■
236	EC	■	■	■		■	■		
237	ED	■	■	■		■	■		■
238	EE	■	■	■		■	■	■	
239	EF	■	■	■		■	■	■	■
240	F0	■	■	■	■				
241	F1	■	■	■	■				■
242	F2	■	■	■	■			■	
243	F3	■	■	■	■			■	■
244	F4	■	■	■	■		■		
245	F5	■	■	■	■		■		■
246	F6	■	■	■	■		■	■	
247	F7	■	■	■	■		■	■	■
248	F8	■	■	■	■	■			
249	F9	■	■	■	■	■			■
250	FA	■	■	■	■	■		■	
251	FB	■	■	■	■	■		■	■
252	FC	■	■	■	■	■	■		
253	FD	■	■	■	■	■	■		■
254	FE	■	■	■	■	■	■	■	
255	FF	■	■	■	■	■	■	■	■

■ = applies
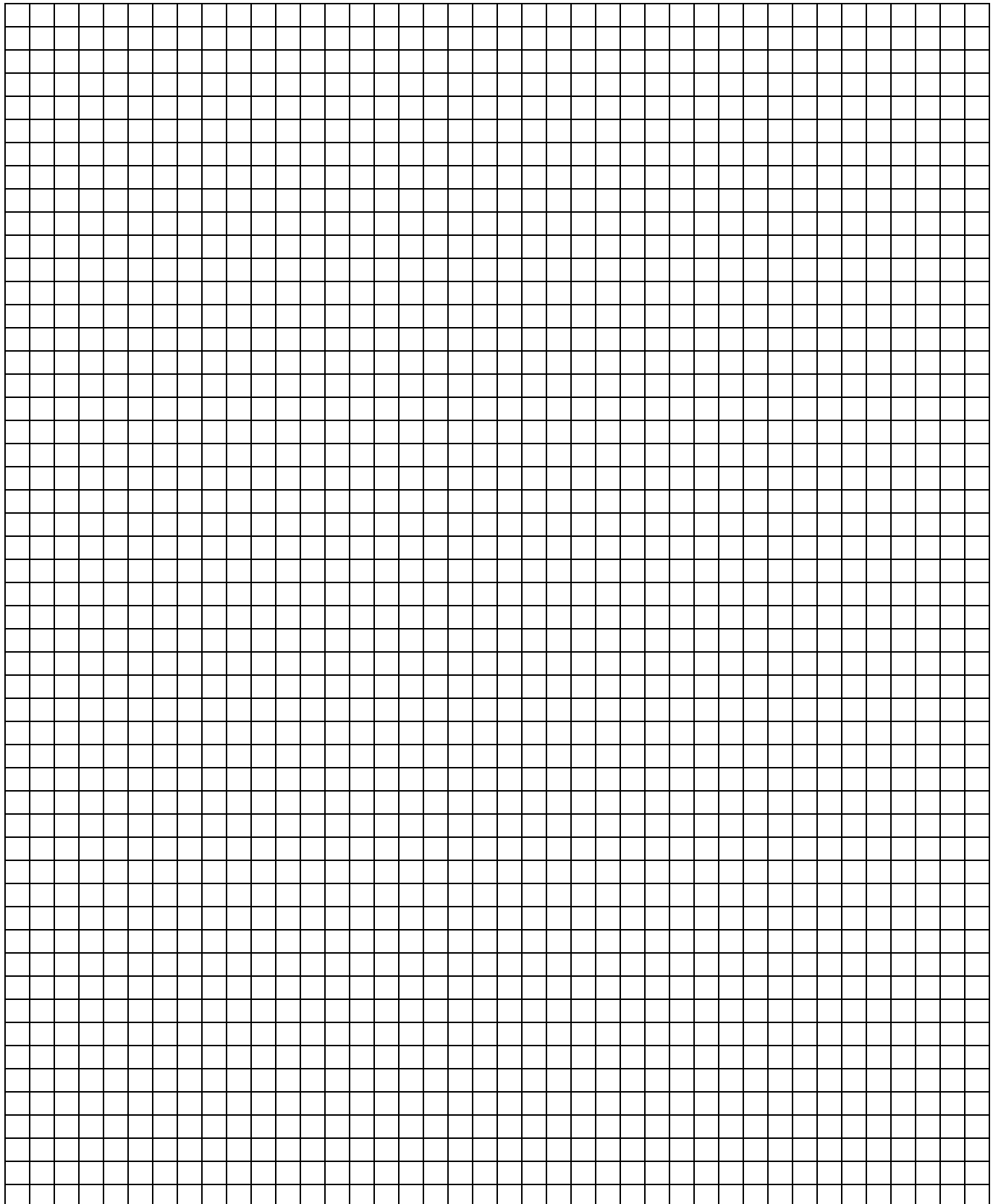
ABB i-bus® KNX   **Appendix**

5.2   Ordering information

Designation	Ordering details short designation	Order No.	bbn 40 16779 EAN	Price group	Weight 1 pc. [kg]	Packaging [pc.]
Universal Dim Actuator, 2-fold, 300 W/VA, MDRC	**UD/S 2.300.2**	2CDG 110 074 R0011	**66306 9**	26	0,225 kg	1
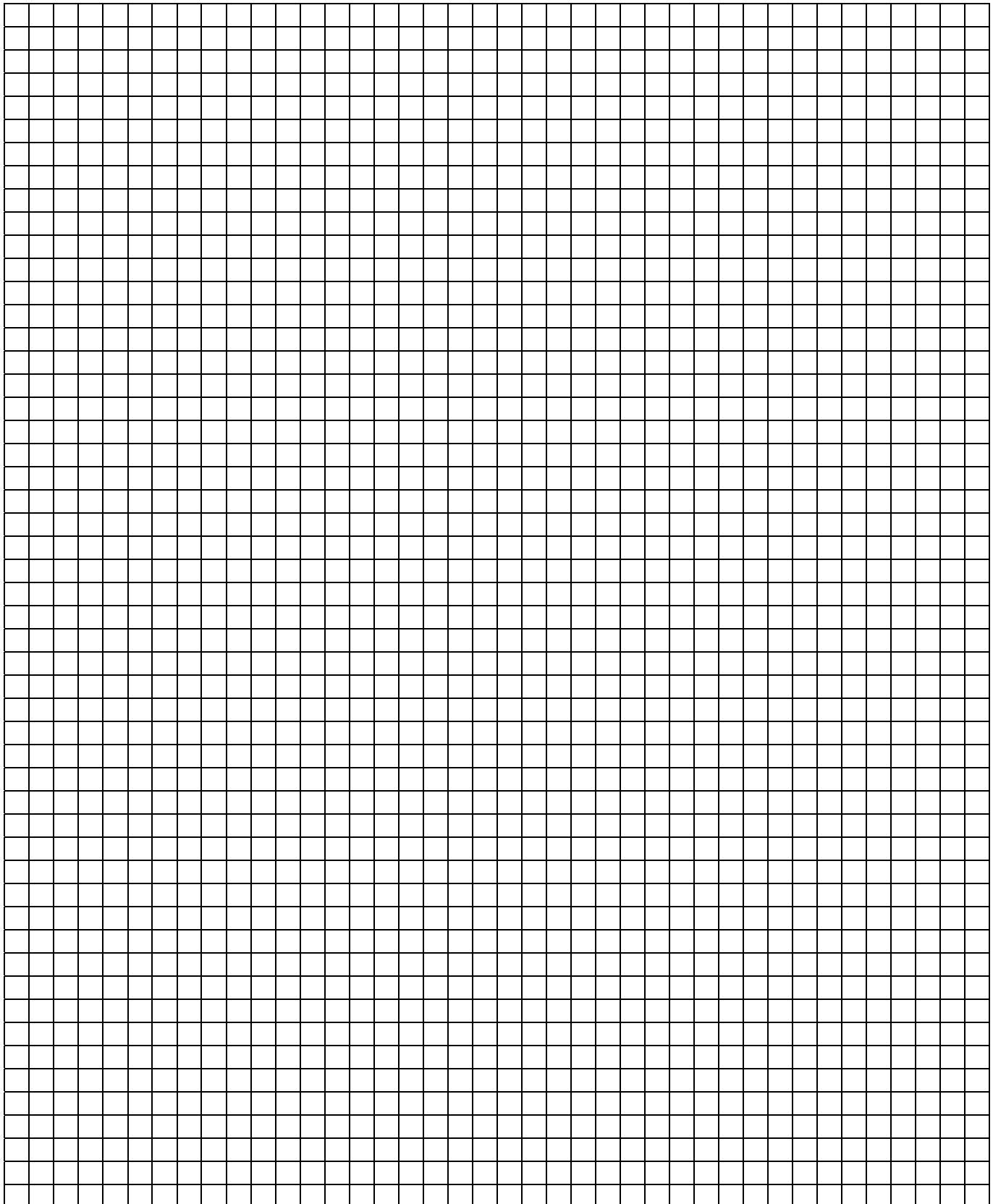
ABB i-bus® KNX **Appendix**

Notes

ABB i-bus® KNX   **Appendix**

Notes

ABB i-bus® KNX   **Appendix**

Notes

ABB

Your KNX-Partner

www.abb.com/knx