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Flush-mounted brightness controller
Surface-mounted brightness controller

Order-No. 2102 00

Order-No. 2103 00



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1 Product definition

1.1 Product catalogue

Product name: Flush-mounted brightness controller / Surface-mounted brightness controller

Use: Controller

Form Flush-mounted
Surface-mounted

Order-No. 2102 00 / 2103 00

1.2 Function

The device can be used either for simple brightness on-off control (switching) or for convenient constant light regulation (dimming).

In **brightness on-off control** the lighting is switched on as soon as the brightness drops below the parameterised lower limiting value. Conversely, the lighting is switched off as soon as the brightness exceeds the set upper limiting value. This means that the brightness controller can also be used in systems that are equipped solely with switchable luminaires. As a special case of the brightness on-off control, the operating mode "only automatic switch-on" can be set. In this operating mode the lighting is only switched on depending on the brightness, and must be switched off again manually or via a time program, for example. As an additional special case of the brightness on-off control, the operating mode "only automatic switch-off" can be set. In this operating mode the lighting is only switched off depending on the brightness, after it was previously switched on manually or via automatic timing, for example.

In **constant light regulation** the lighting is regulated to the specified brightness setpoint via dimmer actuators or control units, depending on the lamp and the installation. In this type of control the brightness setpoint can be preselected either as a parameter or alternatively via the bus by means of a communication object.

Furthermore, in "Master/Slave mode" up to four additional luminaire groups can be dimmed as slaves either to the same value or each to a different value differing from the master dimming value by a positive or negative offset. Controlling one or more luminaire groups as a slave is advantageous, for example, when there are several work stations in the room, but the device has been installed only over one work station. Depending on whether the slave work stations are located closer to the window or farther from the window than the master work station, the corresponding luminaire group must be dimmed down or up accordingly.

The power supply for the device is solely via the bus voltage.

The application program can be loaded with the ETS 2 Version V1.3 or higher and with the ETS 3. After programming of data with the ETS, automatic mode is always switched off.

The device is suitable for fixed installation in dry indoor areas.

2 Fitting, electrical connection and operation

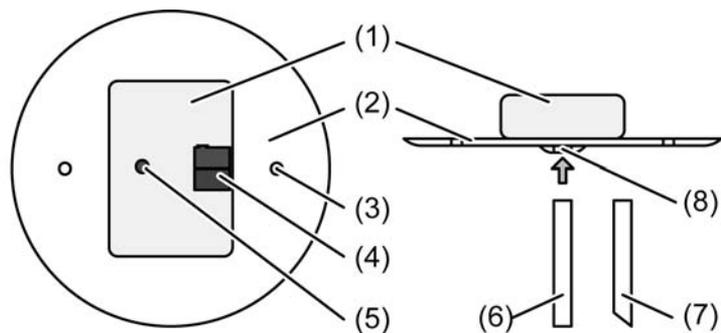
2.1 Safety instructions

Electrical equipment may only be installed and fitted by electrically skilled persons. The applicable accident prevention regulations must be observed.

Failure to observe the instructions may cause damage to the device and result in fire and other hazards.

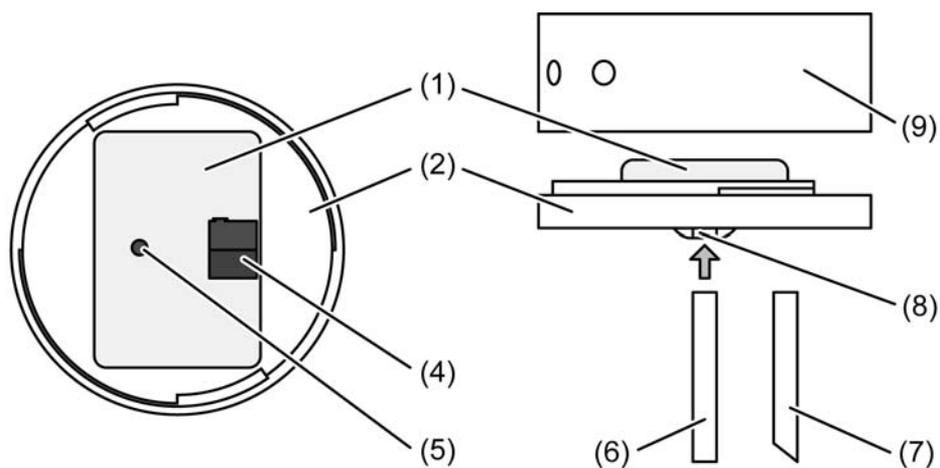
Do not shorten or grind the rigid fibre-optic rod nor use it for any other purpose.

2.2 Device components



picture 1: Brightness controller, flush-mounted

- (1) Brightness controller
- (2) Cover
- (3) Screwholes
- (4) KNX connection terminal
- (5) Programming button
- (6) Rigid fibre-optic rod with straight incidence
- (7) Rigid fibre-optic rod with sloping incidence
- (8) Sensor opening and programming LED (red)



picture 2: Brightness controller, surface-mounted

- (9) Surface-mounted housing

2.3 Fitting and electrical connection



DANGER!

Electrical shock when live parts are touched.

Electrical shocks can be fatal.

Before working on the device, enable all the corresponding miniature circuit breakers. Cover up live parts in the working environment.



DANGER!

When connecting the bus and mains voltage wires in a shared box, the KNX bus line may come into contact with the mains voltage.

This endangers the safety of the entire KNX installation. People at remote devices may also receive an electric shock.

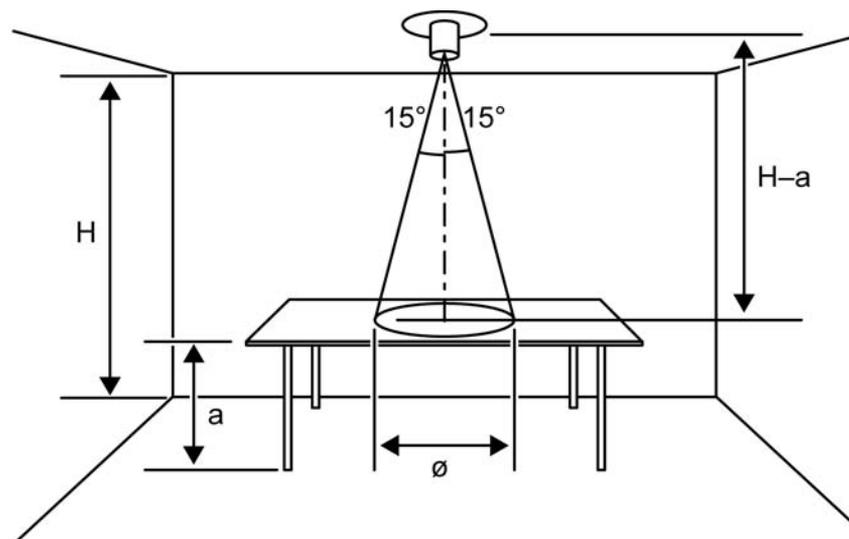
Do not place bus and mains voltage cables together in a connection compartment of the device (flush-mounted/surface-mounted box).

Selecting the installation location

The device measures the brightness on a work surface. Select the installation location such that the work surface is recorded fully.

Light falling directly on the sensor or reflected by shiny surfaces causes incorrect measuring results and impedes control. To ensure fault-free operation, the controller must only measure diffused, reflected light.

- i** When delivered, the light measurement is optimised for installation at a height of 2.50 m directly over a work surface of 0.75 m height with approx. 30 % reflection. With differing situations, please calibrate the controller (see page 8).
- i** The device is suitable for fixed installation in dry indoor areas.
 - Install the brightness controller directly above the work surface on the room ceiling (picture 3).



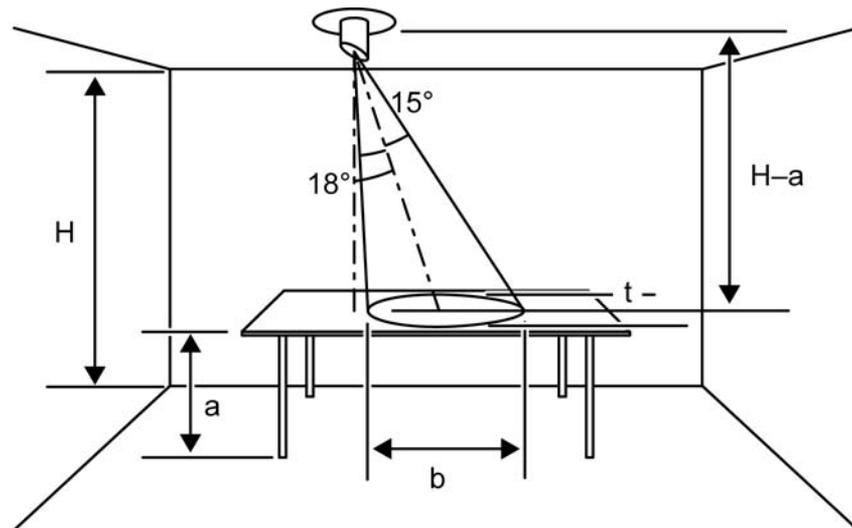
picture 3: Rigid fibre-optic rod with straight incidence

H Room height

a Height of the work surface

ø Diameter of the measuring surface: $\varnothing = (H - a) \cdot 0.54$

- If installation is not possible directly over the work surface, then install the brightness controller with a side offset (picture 4). The detection cone is then to the side of the surface to be measured.



picture 4: Rigid fibre-optic rod with sloping incidence

- b Width of the measuring surface: $b = (H - a) \cdot 0.6$
- t Depth of the measuring surface: $t = (H - a) \cdot 0.56$

Fitting and connecting a flush-mounted device

Use an appliance box to DIN 49073. The screwholes (3) in the cover (2) fit the contour of the appliance box.

- Connect device (1) to the bus line with KNX connecting terminal (4).
- Assign physical address (see chapter 2.4. Commissioning).
- Place the device in the appliance box.
- Screw the cover (3) to the appliance box using the fastening screws provided.

Fitting and connecting a surface-mounted device

- Install the surface-mounted housing (9) on the room ceiling.
- Connect device (1) to the bus line with KNX connecting terminal (4).
- Assign physical address (see chapter 2.4. Commissioning).
- Place the device with the cover (2) on the surface-mounted housing. Turn the cover to fix it to the surface-mounted housing.

2.4 Commissioning

After the device has been connected to the bus and mounted on the ceiling, it can be put into operation. Commissioning is essentially confined to programming via the ETS, inserting the rigid fibre-optic rod and calibrating the brightness sensor.

Loading the physical address and application software

The Programming LED is located in the sensor opening (8) on the front side of the device.

The device is connected and ready for operation.

An appropriate device must be set up and configured in the ETS project.

- Switch on the bus voltage
- Activating Programming mode: press the programming button (5).
The Programming LED flashes.
- Program the physical address with the help of the ETS.
The programming LED goes out.
- Write the physical address on the device label.
- Load the application data into the device using the ETS.

Inserting a rigid fibre-optic rod with straight incidence

The controller is directly above the work surface (picture 3).

- Insert the rigid fibre-optic rod with a straight incidence (6) approx. 10 mm into the sensor opening (8).

Inserting a rigid fibre-optic rod with sloping incidence

The controller is above and to the side of the work surface (picture 4).

- Insert the rigid fibre-optic rod with a sloping incidence (7) approx. 10 mm into the sensor opening (8).
- Align the rigid fibre-optic rod (7) in such a way that the longer side of the rod points towards the work surface to be measured.

i When using a rigid fibre-optic rod with a sloping incidence, be sure to calibrate the controller.

Calibrating the controller

The installation height, lighting situation and degree of reflection influence the controller. Calibrate the controller for the most accurate constant light regulation or brightness measurement or if the rigid fibre-optic rod is used with sloping incidence (7).

The controller is calibrated via a "Calibrate setpoint" bus telegram. The controller programming must make the reception of this telegram possible.

Calibrate the controller with as little daylight incidence as possible. If necessary, darken the room.

Use a calibrated light meter.

- Switch on the lighting to be controlled above the work surface.
- Measure the lighting strength on the work surface.
- Set the lighting so that the light meter shows the required setpoint of the preset operation mode, e.g. 500 lx.
- Send a "Calibrate setpoint" telegram to the controller via the bus.

i For further information on calibration, see "Software description" (see page 18-19).

3 Technical data

KNX

KNX medium	TP 1
Commissioning mode	S mode
Rated voltage KNX	DC 21 V ... 32 V SELV
Current consumption KNX	15 mA

Sensor

Measuring range	0 ... 2000 lx
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General

Mark of approval	KNX / EIB
Protection class	IP 20
Safety class	III
Ambient temperature	-5 ... +45 °C
Storage/transport temperature	-25 ... +70 °C
Relative humidity	max. 93 % (No moisture condensation)
Weight	
Order-No. 2102 00	approx. 30g
Order-No. 2103 00	approx. 50g
Dimensions L×W×H (without cover)	
Order-No. 2102 00	50×35×15 mm
Order-No. 2103 00	—
Dimensions Ø×H (without fibre-optic cable)	
Order-No. 2102 00	—
Order-No. 2103 00	approx. 70 x 33 mm

4 Software description

4.1 Software specification

ETS search paths: - physical sensors / brightness / Flush-mounted brightness controller

 - physical sensors / brightness / Surface-mounted brightness controller

Configuration: S-mode standard

PEI type: "00"_{Hex} / "0"_{Dec}

PEI connector: No connector

Application program:

No.	Short description	Name	Version	from mask version
1	Brightness controller with switching on-off control or dimming constant light regulation.	Brightness controller A01001	0.1	2.5

4.2 Software "Brightness controller A01001"

4.2.1 Scope of functions

- Configurable for on-off control (switching) or constant light regulation (dimming via value).
- With constant light regulation: the number (0..4) of additional luminaire groups (slaves) to be dimmed differently via a brightness value can be set.
- Special case for on-off control: "only automatic switch-on" and "only automatic switch-off" of the lighting is possible.
- Transmission of the measured brightness value to the bus as a 2-byte value. Transmission when change, when read request, or also cyclically.
- If required, cyclic transmission of the switching and dimming value commands for light control.
- Response to bus voltage return can be parameterised in the ETS.
- Setpoint specification for brightness control via parameter or over the bus by means of 2-byte communication objects.
- Calibration of the sensor brightness value determined by the device by means of independent reference measurement and bus telegram.
- The automatic mode of the brightness control can be deactivated as required by means of manual operation of the lighting system (e.g. by manual operation of a push-button sensor).

4.2.2 Software information

ETS

The application program can be loaded with the ETS 2 Version V1.3 or higher and with the ETS 3. After programming of data with the ETS, automatic mode is always switched off.

4.2.3 Object table

Number of communication objects:	17
Number of addresses (max):	100
Number of assignments (max):	120
Dynamic table management	No
Maximum table length	---

Function: Enabling control

Object	Function	Name	Type	DPT	Flag
 ⁰	On / Off	Presence	1-bit	1.001	C, W, T, -

Description This object can be linked with the on/off switching command transmitted by a presence detector or presence button. This object is used to switch on or off both the brightness control or constant light regulation, and at the same time the automatic mode of the brightness controller (cf. object 1).
 If the presence status = OFF and if a Presence = ON telegram is received, the control and automatic mode are switched on. If, on the other hand, the presence status = ON and an additional Presence = ON telegram is received, then this does not change the status of the "Automatic mode" object (i.e. if automatic mode is not enabled it remains disabled).
 If the presence status = OFF, a Presence = ON telegram is received and the room brightness is below the parameterised setpoint, then the lighting is switched in brightness on-off control. In constant light regulation, in this case this would be decided by the parameterisation. Either the lighting is switched on (to the switch-on value parameterised for the actuator) and then dimmed automatically, or a dimming value telegram is transmitted immediately. In any case the control tries to regulate the brightness to the setpoint.
 If, on the other hand, it is bright enough in the room when Presence = ON is received, then the lighting is only switched on automatically later by the activated brightness control or constant light regulation if the room brightness has dropped below the setpoint.

Function: Enabling control

Object	Function	Name	Type	DPT	Flag
 ¹	On / Off	Automatic mode	1-bit	1.001	C, W, -, R

Description This object can, for example, be linked with a pushbutton that is used to switch the brightness controller on or off via the automatic mode. In this manner it is possible to enable or disable the brightness control or constant light regulation.
 The command Automatic mode = OFF is used when brightness control is activated to interrupt the automatic control of the lighting via switching or dimming value commands. In constant light regulation this freezes the current brightness state of the lighting. The lighting can then be dimmed by the user of the room to a desired value without the lighting state being overridden and changed immediately by the constant light regulation.
 If the device receives the command Automatic mode = ON, the light control is enabled again.

Function: Manual operation

Object	Function	Name	Type	DPT	Flag
 ²	Switching	Automatic OFF via	1-bit	1.001	C, W, -, -

Description Enter here the group address via which the lighting will be switched manually if required. When a switching command is received via this object, the brightness control or constant light regulation is deactivated. The telegram contents (0 or 1) are not relevant here. The lighting setting is then not changed by the controller until the automatic mode is switched on again via Object 1.

Function: Manual operation

Object	Function	Name	Type	DPT	Flag
 ³	Dimming	Automatic OFF via	4-bit	3.007	C, W, -, -

Description Enter here the group address via which the lighting will be dimmed manually if required. When a dimming command is received via this object, the brightness control or constant light regulation is deactivated. The telegram contents (brighter or darker) are not relevant here. The lighting setting is then not changed by the controller until the automatic mode is switched on again via Object 1.

Function: Manual operation

Object	Function	Name	Type	DPT	Flag
 ⁴	Dimming value	Automatic OFF via	1-byte	5.001	C, W, -, -

Description Enter here the group address via which the lighting will be dimmed manually to a dimming value if required. When a dimming value command is received via this object, the brightness control or constant light regulation is deactivated. The telegram contents (dimming value in %) are not relevant here. The lighting setting is then not changed by the controller until the automatic mode is switched on again via Object 1.
Note: Under no circumstances may the group address used in Object 10 (dimming value of the controller to the lighting in case of constant light regulation) be used here, because otherwise it would disable itself when the first dimming value is transmitted!

Function: External setpoint specification - constant light regulation

Object	Function	Name	Type	DPT	Flag
 ⁵	Value in lux	Constant light regulation setpoint	2-byte	9.004	C, W, -, R

Description This object is only available if the parameter "Operating mode" is set to "Constant light regulation" and the parameter "Setpoint as" is set to "Communication object". Then if necessary the brightness setpoint which is set at the factory to 600 lux can be overwritten using this object. If a new setpoint is received, it is immediately saved in the non-volatile memory of the device and used for control.

Function: External setpoint specification - brightness control

Object	Function	Name	Type	DPT	Flag
 6	Value in lux	Switch-on setpoint	2-byte	9.004	C, W, -, R

Description This object is only available if the parameter "Operating mode" is set to "Brightness on-off control" or "Only automatic switch-on" and the parameter "Setpoint as" is set to "Communication object". Then if necessary the switch-on setpoint which is set at the factory to 500 lux can be overwritten using this object. If a new setpoint is received, it is immediately saved in the non-volatile memory of the device and used for control.

Function: External setpoint specification - brightness control

Object	Function	Name	Type	DPT	Flag
 7	Value in lux	Switch-off setpoint	2-byte	9.004	C, W, -, R

Description This object is only available if the parameter "Operating mode" is set to "Brightness on-off control" or "Only automatic switch-off" and the parameter "Setpoint as" is set to "Communication object". Then if necessary the switch-off setpoint which is set at the factory to 900 lux can be overwritten using this object. If a new setpoint is received, it is immediately saved in the non-volatile memory of the device and used for control.

Function: Sensor calibration

Object	Function	Name	Type	DPT	Flag
 8	calibration	Setpoint	1-bit	1.001	C, W, -, -

Description This object can be used if necessary to trigger saving of the currently measured brightness value as a calibration value. This presupposes that the the measured brightness value corresponds to the current setpoint. Therefore either the setpoint (depending on the operating mode selected either the setpoint for the constant light regulation, or the switch-off or switch-on setpoint for on-off control and with solely automatic switch-off, or the switch-on setpoint for solely automatic switch-off) must first be set to the measured lux value before this object can be described with a telegram. After calibration the setpoint must be set back to the desired value for the set brightness control. Alternatively the lighting can be dimmed in order to set a lighting situation according to the setpoint.
Calibration is performed independently of the telegram contents (calibration with 0 or 1)

Note: We recommend that you perform calibration with as little daylight as possible contributing to the work station lighting.

Function: Brightness measurement

Object	Function	Name	Type	DPT	Flag
 9	Value in lux	Brightness, measured value	2-byte	9,004	C, W, -, R

Description This object can be used if necessary to transmit or read the measured brightness value (sensor measurement value) via the bus.

Function: Control output / master connection

Object	Function	Name	Type	DPT	Flag
 ¹⁰	8-bit value	Master, dimming value	1-byte	5.001	C, -, T, R

Description This object is only available for the operating mode "Constant light regulation". The group address linked to this object can be used to transmit the dimming value to the actuator via the bus. In Master/Slave mode this object is used to control the actuator of the master lighting group.

Function: Slave connection / expansion of the luminaire groups

Object	Function	Name	Type	DPT	Flag
 ¹¹	8-bit value	Slave 1, dimming value	1-byte	5.001	C, -, T, R

Description This object is only available in the operating mode "Constant light regulation" in master/slave mode, if the number of slaves is set to 1 or more in the ETS. The group address linked to this object can be used to transmit or query the dimming value of the first slave luminaire group via the bus.

Function: Slave connection / expansion of the luminaire groups

Object	Function	Name	Type	DPT	Flag
 ¹²	8-bit value	Slave 2, dimming value	1-byte	5.001	C, -, T, R

Description This object is only available in the operating mode "Constant light regulation" in master/slave mode, if the number of slaves is set to 2 or more in the ETS. The group address linked to this object can be used to transmit or query the dimming value of the second slave luminaire group via the bus.

Function: Slave connection / expansion of the luminaire groups

Object	Function	Name	Type	DPT	Flag
 ¹³	8-bit value	Slave 3, dimming value	1-byte	5.001	C, -, T, R

Description This object is only available in the operating mode "Constant light regulation" in master/slave mode, if the number of slaves is set to 3 or more in the ETS. The group address linked to this object can be used to transmit or query the dimming value of the third slave luminaire group via the bus.

Function: Slave connection / expansion of the luminaire groups

Object	Function	Name	Type	DPT	Flag
 ¹⁴	8-bit value	Slave 4, dimming value	1-byte	5.001	C, -, T, R

Description This object is only available in the operating mode "Constant light regulation" in master/slave mode, if the number of slaves is set to 4 in the ETS. The group address linked to this object can be used to transmit or query the dimming value of the fourth slave luminaire group via the bus.

Function: Control output

Object	Function	Name	Type	DPT	Flag
 ¹⁵	On / Off	Switching	1-bit	1.001	C, W, T, -

Description This object is always available in the operating mode "Brightness on-off control", and in the operating mode "Constant light regulation" only if the parameter "Start and end constant light regulation with" has been set to "Switching telegram".
 In brightness on-off control this object is used to output the switching command to the lighting being controlled. The lighting is also switched via this object in the operating modes "only automatic switch-on" and "only automatic switch-off".
 In constant light regulation this object is used to switch the lighting on or off before the controller dims the actuator to the setpoint via Object 10.
 This object should be linked with the "Switching" object of the actuators being controlled (master and all slaves) using a group address.

Function: Control input

Object	Function	Name	Type	DPT	Flag
 ¹⁶	Dimming value	Status of actuator dimming value	1-byte	5.001	C, W, T, -

Description This object is used to read the current dimming value from the dimming actuator.
Note: The feedback object of the actuator linked with this must thus be enabled for reading (set the "Read" flag!).
 When the brightness control is switched on the control is started beginning with this dimming value. If the object is not linked, the brightness control is performed starting with the dimming value 0 %.

4.2.4 Functional description

Control operating mode

The device can be used either for simple brightness on-off control (switching) or for convenient constant light regulation (dimming).

In brightness on-off control the lighting is switched on as soon as the brightness drops below the parameterised lower limiting value. Conversely, the lighting is switched off as soon as the brightness exceeds the set upper limiting value. This means that the brightness controller can also be used in systems that are equipped solely with switchable luminaires. As a special case of the brightness on-off control, the operating mode "only automatic switch-on" can be set. In this operating mode the lighting is only switched on depending on the brightness, and must be switched off again manually or via a time program, for example. As an additional special case of the brightness on-off control, the operating mode "only automatic switch-off" can be set. In this operating mode the lighting is only switched off depending on the brightness, after it was previously switched on manually or via automatic timing, for example.

In constant light regulation the lighting is regulated to the specified brightness setpoint via dimming actuators or control units, depending on the lamp and the installation. In this type of control the brightness setpoint can be preselected either as a parameter or alternatively via the bus by means of a communication object. Furthermore, in "Master/Slave mode" up to four additional luminaire groups can be dimmed as slaves either to the same value or each to a different value differing from the master dimming value by a positive or negative offset. Controlling one or more luminaire groups as a slave is advantageous, for example, when there are several work stations in the room, but the device has been installed only over one work station. Depending on whether the slave work stations are located closer to the window or farther from the window than the master work station, the corresponding luminaire group must be dimmed down or up accordingly.

Calibration

In the brightness measurement an average is always determined using the last measured value and the new measured value, in order to damp out brightness jumps even during the measurement. In the brightness controller the brightness measurement is pre-calibrated with a rigid fibre-optic rod with a straight light incidence, mounted at a height of 2.50 m over a work station at a height of 0.75 m with a work surface with approx. 30% degree of reflection. These conditions vary, however, in practice, which means that it may be necessary to perform re-calibration of the brightness measurement after installation. Thus for example recalibration is necessary if the sloping fibre-optic cable has been used in the device in the course of commissioning (see page 8).

A calibration of the brightness measurement can be performed via the bus and using the ETS. In order to perform a calibration, communication via the bus must be possible. The installation and commissioning of the device must thus be completed properly before this.

In the case of constant light regulation the lighting must be switched on and dimmed in such a way that the lux value shown on a calibrated light meter on the work surface directly under the controller corresponds to the current setpoint for the constant light regulation. Alternatively the setpoint for the constant light regulation can also be set in the ETS or using the 2-byte object "Setpoint..." to the displayed lux value. After that a telegram must be sent on communication object 8 "Calibrate setpoint" to the brightness controller (the contents of the telegram, a 0 or 1, is of no significance here). Only after that is it possible - if set previously - to set the setpoint for the constant light regulation back to the desired value.

In case of on-off brightness control or for the operating mode "only automatic switch-off" the lighting should be set so that the lux value shown on the light meter corresponds to the current setpoint for switch-off of the lighting. Here too it is possible as an alternative to first set the switch-off setpoint to the displayed lux value. In case of the operating mode "only automatic switch-off" the lighting should be dimmed so that the lux value shown on the light meter corresponds to the current setpoint for switch-on of the lighting. Alternatively the switch-on

setpoint can first be set to the displayed lux value.

After that a telegram must be sent on communication object 8 "Calibrate setpoint" to the brightness controller. Only after that is it possible - if set previously - to set the setpoint back to the desired value.

A successful calibration can be performed by reading communication object 9 "Brightness, measured value". In case of unchanged brightness conditions after the last calibration the measured brightness value must correspond to the calibration value.

Response to a device reset

In case of bus voltage failure the current status of the objects "Presence" and "Automatic mode" and the last switching command or dimming value sent by the controller are saved in the non-volatile memory. In case of bus voltage return the brightness controller adopts the status of the saved objects and then enters the operating status determined by the two status values and the parameter "Response to bus voltage return".

If this causes the automatic mode to be activated, the device transmits a switching or dimming value telegram only if the switching state or dimming value calculated by the controller based on the current light conditions differs from the one last transmitted.

4.2.5 Parameters

Description	Values	Comment
<p>☐ General</p> <p>Operating mode</p>	<p>Constant light regulation</p> <p>Brightness on-off control</p> <p>Only automatic switch-on</p> <p>Only automatic switch-off</p>	<p>This parameter is used to set whether constant light regulation for dimmable luminaires, or brightness on-off control, or only automatic switch-on or switch-off for switchable luminaires is desired.</p>
<p>Number of slaves</p>	<p>0</p> <p>1</p> <p>2</p> <p>3</p> <p>4</p>	<p>This parameter is only visible if the parameter "Operating mode" is set to "Constant light regulation". This parameter is used to set the number of desired slave luminaire groups whose dimming value can be shifted by a positive or negative value relative to the master dimming value. In accordance with the number of slave selected, the corresponding number of communication objects "Slave x, dimming value" and parameters "Offset Slave x from master dimming value in percent (-100...100)" are added to the "Constant light regulation" parameter page.</p> <p>i The slave mode makes it possible to adjust various luminaires to the same dimming value or to various dimming values via a single brightness sensor. Here it is not ensured that exactly the same brightness level will be achieved under a slave luminaire as under the master luminaire, because the brightness is only measured and controlled at the latter.</p>
<p>Transmit brightness measured value</p>	<p>only via read request</p> <p>cyclical</p> <p>When the brightness value is changed</p> <p>When the brightness value is changed & cyclically</p>	<p>This parameter determines whether and when the brightness measured value is transmitted to the bus.</p> <p>The brightness measured value is not transmitted to the bus independently, but can be read.</p> <p>The brightness measured value is transmitted automatically to the bus after the parameterised cycle time.</p> <p>The brightness measured value is transmitted after it changes by the parameterised value.</p> <p>The brightness measured value is transmitted to the bus after it changes by the parameterised value and</p>

additionally after the set cycle time elapses.

<p>Minimum brightness change for new transmission of the measured value</p>	<p>15 lux 30 lux 45 lux 60 lux</p>	<p>This parameter is used to set the minimum brightness change for automatically transmitting a new brightness measured value. This parameter is only visible if the parameter "Transmit brightness measured value" is parameterised to "When the brightness value is changed" or "When the brightness value is changed & cyclically".</p>
<p>Cycle time for brightness measured value</p>	<p>15 seconds 30 seconds 60 seconds 5 minutes 10 minutes 15 minutes 30 minutes 60 minutes</p>	<p>This parameter is used to set the cycle time for the automatic transmission of the brightness measured value. This parameter is only visible if the parameter "Transmit brightness measured value" is parameterised to "Cyclically" or "When the brightness value is changed & cyclically".</p>
<p>Transmit all switching command and dimming value</p>	<p>No 15 minutes 30 minutes 60 minutes</p>	<p>This parameter can be used if necessary to activate cyclical transmission of the last controller switching command or dimming value. Cyclical transmission is only performed when automatic mode is switched on.</p>
<p>Response to bus voltage return</p>	<p>Like before the bus voltage failure Automatic mode off</p>	<p>In case of bus voltage failure the current status of the objects "Presence" and "Automatic mode" and the last switching command or dimming value sent by the controller are saved in the non-volatile memory. In case of bus voltage return the brightness controller adopts the status of the saved objects and then enters the operating status determined by the two status values and this parameter. If the automatic mode should be switched off when the bus voltage returns, this can be defined via the setting "Automatic mode off".</p>

Constant light regulation (Only visible with "Operating mode = constant light regulation"!)

<p>Setpoint as</p>	<p>Parameters Communication object</p>	<p>This parameter is used to set whether the setpoint for constant light regulation should be set as a parameter to a fixed value that can only be changed using the ETS, or whether it should be possible to change the brightness setpoint at any time via the bus using a communication object. The value</p>
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		received via the communication object overwrites the factory-set parameter value (600 lux), and is saved in the device in non-volatile memory.
Setpoint in lux (250 – 1600)	250... 600 ...1600	This parameter is used to set the brightness setpoint for the constant light regulation. This parameter is only visible if the parameter "Setpoint as" is set to "Parameter".
Maximum deviation from the setpoint	15 lux 30 lux 45 lux 60 lux	This parameter determines how precisely the desired setpoint is adjusted. This is necessary because control is performed using dimming steps. Therefore when the maximum deviation from the setpoint is too small it may occur that in the event of a "Brighter" control step the brightness is already above the setpoint, and in the event of a "Darker" control step the brightness is already below the setpoint. This leads to constant dimming up and down, and thus to continuous brightness fluctuations. If this is the case, the permissible deviation from the setpoint must be increased or the increment for dimming (see the next parameter) must be decreased.
Max. increment for dimming	0.5 % 1 % 1.5 % 2 % 2.5 % 3 % 5 %	This parameter is used to set the maximum "increment" for dimming (this is the maximum value by which a new dimming value can be larger or smaller than the previous one).
Output dimming value after	0.5 seconds 1 second 2 seconds 3 seconds 5 seconds	This parameter is used to define the wait time between two dimming steps in constant light regulation in master mode. After a dimming step the time configured here must elapse before an additional dimming step can be transmitted. This ensures that in constant light regulation there are no abrupt brightness changes that might be perceived as unpleasant by the user of the room, even when the actuator has short dimming times.
Start and end constant light regulation with	Dimming value telegram Switching telegram	This parameter is only visible if the parameter "Operating mode" is set to "Constant light regulation". This parameter is used to define whether the

lighting should be switched on after receipt of the telegram "Presence= ON" (if the status was previously "Presence = OFF" war) either via a switching command "ON", or after a dimming value command. The lighting is then switched off depending on the setting wither via an "OFF" switching command or a dimming value command 0 %.

In case of switching-on via a switching command as a part of control the lighting is switched on to a value parameterised in the dimming actuator and then dimmed gradually from this value by the controller until the brightness setpoint and actual values correspond. For this purpose the controller requests the dimming value status from the controller 3 seconds after the switch-on telegram is transmitted. Once the dimming value status is received, the brightness control begins at the current dimming value of the actuator.

It is dimmed up or down accordingly depending on the deviation between the actual and setpoint values. Therefore it is advisable to parameterise the actuator in such a way that after switch-on it is already set to a value that the constant light regulation will be dimmed to later.

If no response from the actuator is received by the brightness sensor within 2 seconds after the query, the control is started assuming an actuator dimming value of 0 % (i.e. the controller starts control at a dimming value of 0 % instead of at the current dimming value of the actuator). It is then dimmed up until the actual value of the setpoint corresponds to the brightness.

If a telegram "Presence = ON" is received and the presence status is "OFF" or if an automatic mode that has been switched off is switched back to "ON", then the dimming value status of the actuator is requested immediately, and the procedure described above is followed. If the dimming value status of the actuator cannot be received (for example if the object is not linked with any group address), then the controller always begins its control with a dimming value of 0 %. If luminaires are already switched on, this can lead to a transient response to the dimming value required for lighting. This does not, however, compromise the function of the brightness controller.

-100...0...100

This parameter is only visible if at least one slave has been set. This parameter

Offset of slave 1 from master dimming value in percent (-100...100)		is use to set the offset value that has to be added to or subtracted from the first slave compared to the master dimming value.
Offset of slave 2 from master dimming value in percent (-100...100)	-100... 0 ...100	This parameter is only visible if two slaves have been set. This parameter is use to set the offset value that has to be added to or subtracted from the second slave compared to the master dimming value.
Offset of slave 3 from master dimming value in percent (-100...100)	-100... 0 ...100	This parameter is only visible if three slaves have been set. This parameter is use to set the offset value that has to be added to or subtracted from the third slave compared to the master dimming value.
Offset of slave 4 from master dimming value in percent (-100...100)	-100... 0 ...100	This parameter is only visible if four slaves have been set. This parameter is use to set the offset value that has to be added to or subtracted from the fourth slave compared to the master dimming value.
<p><input type="checkbox"/> Brightness on-off control (visible only if "operating mode = brightness on-off control"!) Setpoint as Parameters Communication object</p>		
Switching On, if brightness measurement value <=	250... 500 ...1500	This parameter is used to set whether the setpoints for switching the lighting on and off should be set as parameters to a fixed value that can only be changed using the ETS, or whether it should be possible to change the brightness setpoints at any time via separate communication objects via the bus. The values received via the communication object overwrite the factory-set parameter values (500 lux and 900 lux) and are saved in the device in non-volatile memory.
Switching Off, if brightness measurement value >=	250... 900 ...1500	This parameter is used to set the brightness value that has to be reached or dropped below in order for the controller to switch on the lighting.
		This parameter is used to set the brightness value that has to be reached or exceeded in order for the controller to switch off the lighting.

i Here it must be noted that the brightness values for switching the lighting on and off are significantly different, so that small changes in brightness do not result in the lighting constantly being switched on and off. It is therefore advisable to measure the brightness difference with a light meter when the lighting is switched on. The difference between the parameterised switch-on value and the switch-off value must be greater than the measured brightness difference, because otherwise switching the lighting on would automatically cause it to be switched off automatically.

Automatic switch-on (Only visible with "Operating mode = Only automatic switch-on!")

Setpoint as	Parameters Communication object	This parameter is used to set whether the setpoint for switching the lighting on should be set as a parameter to a fixed value that can only be changed using the ETS, or whether it should be possible to change the brightness setpoint at any time via the bus using a communication object. The value received via the communication object overwrites the factory-set parameter value (500 lux), and is saved in the device in non-volatile memory.
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Switching On, if brightness measurement value <=	250... 500 ...1500	This parameter is used to set the brightness value that has to be reached or dropped below in order for the controller to switch on the lighting.
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Automatic switch-off (Only visible with "Operating mode = Only automatic switch-off!")

Setpoint as	Parameters Communication object	This parameter is used to set whether the setpoint for switching the lighting off should be set as a parameter to a fixed value that can only be changed using the ETS, or whether it should be possible to change the brightness setpoint at any time via the bus using a communication object. The value received via the communication object overwrites the factory-set parameter value (900 lux), and is saved in the device in non-volatile memory.
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Switching Off, if brightness measurement value >=	250... 900 ...1500	This parameter is used to set the brightness value that has to be reached or exceeded in order for the controller to switch off the lighting.
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5 Appendix

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