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00 07 Light 800901

Devices Employing the Program

Product family: Controller
Product type: Controller
Manufacturer: Siemens

Name: Light Intensity Control Module N 342
Order-no.:   5WG1 342-1AB01

Application Description

The light intensity control module N 342 allows you to control the light intensity of independent groups of lighting according to the outside light intensity which can be measured by a brightness controller (5WG1 253-4AB01). Take care not to expose the brightness controller to the artificial light. Controlling the lighting can be achieved either as two step control (on/off values) or as continuous control via a specified characteristic when employing lights that can be dimmed. To each of the 10 channels an individual characteristic can be specified by choosing a set of 8 points to define the graph. When using two step control, two characteristics are defined to determining the switching hysteresis. An additional push button is provided to adjusting the automatic control (by manually shifting the characteristics), and to switching it on and off. As a response to bus voltage recovery the lighting control can either be enabled or disabled, or the status from before bus voltage failure can be re-established.
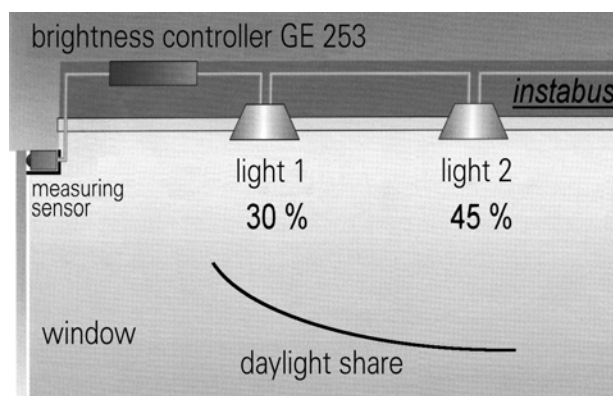
Communication Objects

Product	Program	Order number
no. Function	**Object name**	**Type**
Brightness control module...	00 07 Light 800901	5WG1 342-1AB01
0 Calibrating object	Requirement	1 Byte
1 Calibrating object	Dimming value	1 Byte
2 Calibrating object	Brightness value	2 Byte
3 Control 1	Brightness value	2 Byte
4 Control 1	Switch status	1 Bit
5 Control 1	Brighter / darker	4 Bit
6 Control 1	Set x %	1 Byte
7 Control 1	Status	1 Byte
8 Control 1	Enable / disable control	1 Bit
58 Control 10	Switch status	1 Bit
59 Control 10	Brighter / darker	4 Bit
60 Control 10	Set x %	1 Byte
61 Control 10	Status	1 Byte
62 Control 10	Enable / disable control	1 Bit

Obj	Function	Object name	Type	Flags
0	Calibrating object	Requirement	1-Byte	CW
Via this input object the values "Dimming" and "Light intensity" can be read from the switching/dimming actuator or the brightness controller to a specific control characteristic. Therefore the number of the control characteristic (1-10) must be sent with e.g. the ETS via the assigned group address.			
1	Calibrating object	Dimming value	1-Byte	CR
This object stores the actual dimming value of the switching/dimming actuator on a calibration request. This value can be read by the ETS (read group) via the assigned group address.			
2	Calibrating object	Brightness value	2-Byte	CR
This object stores the actual light intensity value of the brightness controller on a calibration request. This value can be read by the ETS (read group) via the assigned group address.			
3	Control 1	Brightness value	2-Byte	CWT
During the calibration the light intensity control module reads the light intensity value from the brightens controller via the assigned group address and stores it in object [2]. During employment, the light intensity control module receives the actual light intensity value from the brightness controller via this object. Note: A measured value is used which does not equal Lux values.			

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800901, 8 pages

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3.11.1.5.1/1

00 07 Light 800901

Obj	Function	Object name	Type	Flags
4	Control 1	Switch Status	1-Bit	CRWT
	This object is used to sending the two step control's regulating telegrams. I.e. this object provides the link to the switching/dimming actuator to be controlled. When the lighting is to be switched manually as well, the light intensity control module must read these switching telegrams via this object. With an "off" telegram the automatic control is switched off and on again with an "on" telegram. See also the parameter "Minimum on period". Note: If the switching status to be read (by visualization software), this must be achieved with a separate group address in the actuator, otherwise the read request would lock the automatic control.			
5	Control 1	Brighter/ darker	4-Bit	CW
	When the lighting is to be dimmed manually as well, the light intensity control module must read these dimming telegrams via this object to adjusting its control characteristic according to the actual light intensity conditions. I.e. the specified characteristic is shifted up or down according to the difference between set point and actual value.			
6	Control 1	Set x %	1-Byte	CWT
	When employing lights that allow dimming, the dimming value is sent to the switching/dimming actuator according to the respective characteristic. On receiving a dimming value (e.g. from a pushbutton 4-fold), which differs from the currently sent dimming value, a set point shift is calculated and the characteristic is shifted up or down accordingly.			
7	Control 1	Status	1-Byte	CWT
	During calibration the light intensity control module reads the dimming value via the assigned group address from the status object of the switching/dimming actuator and writes it to object [1].			
8	Control 1	Enable / disable control	1-Bit	CRW
	This object allows you to lock and release the control module, e.g. via a push button single, where a logic "0" locks the control and a logic "1" releases it again.			

The controls 2-10 feature the same set of objects.

Maximum number of group addresses: 90
Maximum number of assignments: 110

Parameters

Control 1:

Parameters	Settings
On bus voltage recovery	**s before bus voltage failure** disable control enable control
This parameter rules whether the light intensity control is to be enabled or disabled or whether the status from before bus voltage failure is to be re-established.	
Minimum On time (minutes) (0-255)	0
When the lighting is switching on because of the lighting conditions or manually, the lighting remains switched on to at least this specified on period. When using lights that can be dimmed, switched on refers to the dimming value resulting from the control characteristic. Thus, you can avoid multiple switch on switch off cycles when the lighting conditions are changing quickly. However, this can prove inconvenient with older ECGs, as these had to built to switching to 100% briefly as a technical necessity before establishing the proper dimming value. In case control of dimmable lights does not allow switching off on minimum light intensity, this parameter is ignored.	
Maximum dimming value (125-255)	255
This parameter rules the maximum dimming value that can be sent via object [6]. When dimming manually this value can be exceeded.	
Minimum dimming value On (1-220)	1
If the control is enabled, the lights are switched on when the specified value is exceeded. This parameter is ignored unless the parameter "Response to min. dimming value" is set to switching off.	
Minimum dimming value Off (1-220)	1
If the control is enabled, the lights are switched off when the light intensity drops below the specified value. In case the selected "Minimum on period" has not passed yet or the parameter "Response to min. dimming value" is set to "do not switch off", the light intensity is reduced to the value specified here.	

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3.11.1.5.1/2

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00 07 Light 800901

Parameters	Settings
On minimum dimming value	switch off do not switch off
This parameter provides two modes: **1. do not switch off** On dropping below the parameter "Minimum value to dimming off " the actuator do not switch off but holds this value. **2. switch off** When the period specified in the parameter "Minimum on period" has passed and the light intensity drops to below the value specified in the parameter "Min. off dimming value", the actuator switches off.	
Take over control curve (1-10)	1
This parameter allow to copy characteristics from other controls.	
1.1 Measuring point of brightness value (0-32767)	**0** (disabled)
Dimming value (0-255)	0
Continuous light control: This measured value is the first point of the set to defining the characteristic. The required value can be generated via the calibration objects. Two step light control: The light intensity specified here is the value to switching on. When set to "0", the control is considered disabled.	
1.2 Measuring point of brightness value (0-32767)	0

Control 1.2

Parameters	Settings
Dimming value (0-255)	0
Continuous light control: This measured value is the second point of the set to defining the characteristic. The required value can be generated via the calibration objects. Two step light control: Here, the light intensity to switching on must be entered once more. From this the light intensity control module distinguish the two step light control mode. When set to "0", this value is considered invalid.	

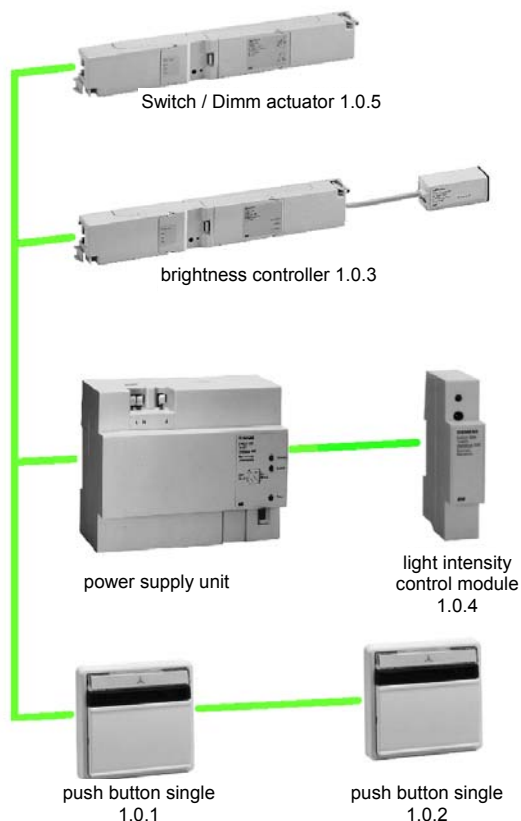| Parameters	Settings
1.3 Measuring point of brightness value (0-32767)	**0**
Dimming value (0-255)	**0**
Continuous light control: This measured value is the third point of the set to defining the characteristic. The required value can be generated via the calibration objects. Two step light control: The light intensity specified here is the hysteresis from which the value to switching off is generated. When set to "0", this value is considered invalid.	
1.4 Measuring point of brightness value (0-32767)	**0**
Dimming value (0-255)	**0**
Continuous light control: This measured value is the fourth point of the set to defining the characteristic. The required value can be generated via the calibration objects. When set to "0", this value is considered invalid. This parameter is ignored when using a two step light control.	
1.5 Measuring point of brightness value (0-32767)	**0**
Dimming value (0-255)	**0**
Continuous light control: This measured value is the fifth point of the set to defining the characteristic. The required value can be generated via the calibration objects. When set to "0", this value is considered invalid. This parameter is ignored when using a two step light control.	
1.6 Measuring point of brightness value (0-32767)	**0**
Dimming value (0-255)	**0**
Continuous light control: This measured value is the sixth point of the set to defining the characteristic. The required value can be generated via the calibration objects. When set to "0", this value is considered invalid. This parameter is ignored when using a two step light control.	
1.7 Measuring point of brightness value (0-32767)	**0**

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800901, 8 pages

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3.11.1.5.1/3

00 07 Light 800901

Control 1.3

| Control 1 | Control 1 2 | **Control 1 3** | Control 2 | Control 2 2 | Control 2 3 | Control 3 |

Dimming value (0-255)   `0`

1.8. Measuring point of brightness value (0-32767)   `0`

Dimming value (0-255)   `0`

Parameters	Settings
Dimming value (0-255)	**0**
Continuous light control: This measured value is the seventh point of the set to defining the characteristic. The required value can be generated via the calibration objects. When set to "0", this value is considered invalid. This parameter is ignored when using a two step light control.	
1.8 Measuring point of brightness value (0-32767)	**0**
Dimming value (0-255)	**0**
Continuous light control: This measured value is the eight point of the set to defining the characteristic. The required value can be generated via the calibration objects. When set to "0", this value is considered invalid. This parameter is ignored when using a two step light control.	

The parameters of the controls 2 to 10 can be set accordingly.

Example

Continuous control

In the example below the light intensity control module controls the lighting according to the daylight conditions via a switching/dimming actuator GE 525. A push Button single (physical. addr.: 1.0.2) is used to switching on and. off, and to dimming, in order to establish the light intensity during operation as required (shifting the control characteristic up or down). Another push button single (physical. addr.: 1.0.1) is used to locking the daylight control. Then, the lighting can only be switched manually.

Overview: Employed bus devices

Switch / Dimm actuator 1.0.5

brightness controller 1.0.3

power supply unit

light intensity control module 1.0.4

push button single 1.0.1

push button single 1.0.2

Required group addresses:

	Address	Subgroup
Maingroup		
Subgroup		
Test-It Controller		
[0] Main group	1	Brightness
	2	Switching
	3	Dimming
	4	Switching, Release
	5	Set Value
	6	Status

00 07 Light 800901

Push button single (lock/release control)

	no.	Object name	Function	Group addr	Type
		Push button UP 210 /Ds/sg	10 S1 Off/On 210601		
	0	Top	Rocker	0/4	1 Bit
	1	Bottom	Rocker	0/4	1 Bit
	2	not used	not used		1 Bit
	3	not used	not used		1 Bit
	4	Left	LEDs	0/4	1 Bit
	5	Centre	LEDs	0/4	1 Bit

Push button single (On/Off/Dimming)

	no.	Object name	Function	Group addr	Type
		Push button UP 210 /Ds/lb	11 S1 Dimmer 210702		
	0	on/off	Rocker switch	0/2	1 Bit
	1	Dimming	Rocker switch	0/3	4 Bit
	2	LED	LED	0/2	1 Bit
	3	LED	LED		1 Bit

Brightness controller GE 253

	no.	Object name	Function	Group addr	Type
		Brightness sensor GE 253	12 S1 LuxValue 210D01		
	0	Send brightness value	Illuminance	0/1	2 Byte
	1	Switch	Enabling/interlocking		1 Bit
	2	Switch	Interlocking		1 Bit
	3	Dimming	Interlocking		4 Bit
	4	Set value	Interlocking		1 Byte

The objects 1 - 4 are not required.

Switching/Dimming actuator GE 525

	no.	Object name	Function	Group addr	Type
		Switch/dim actuator GE 526	11 A1 Dimmer 610105		
	0	Switch, status	ON/OFF	0/2	1 Bit
	1	brighter / darker	Dimming	0/3	4 Bit
	2	Set x %	Value	0/5	1 Byte
	3	Status	Value	0/6	1 Byte

Parameters: dimming period:
90 x 0,5 ms x 256 = 11,5 Sec.

Light intensity control module N 342 (Control 1)

	no.	Object name	Function	Group addr	Type
		Brightness control module N 342	00 07 Light 800901		
	0	Requirement	Calibrating object	0/7	1 Byte
	1	Dimming value	Calibrating object	0/8	1 Byte
	2	Brightness value	Calibrating object	0/9	2 Byte
	3	Brightness value	Control 1	0/1	2 Byte
	4	Switch status	Control 1	0/2	1 Bit
	5	Brighter / darker	Control 1	0/3	4 Bit
	6	Set x %	Control 1	0/5	1 Byte
	7	Status	Control 1	0/6	1 Byte
	8	Enable / disable control	Control 1	0/4	1 Bit

The parameters of the light intensity control module were set as follows:

|	
Maximum dimming value (125-255)	220
Minimum value to dimming on (1-220)	125
Minimum value to dimming off (1-220)	75
Response to min. dimming value	switch off

A: Calibration point 1.1
    Light intensity value (0-32767)   1200
    dimming value (0-255)   200
B: Calibration point 1.2
    Light intensity value (0-32767)   2000
    dimming value (0-255)   150
C: Calibration point 1.3
    Light intensity value (0-32767)   3500
    dimming value (0-255)   100
D: Calibration point 1.4
    Light intensity value (0-32767)   5000
    dimming value (0-255)   55
E: Calibration point 1.5
    Light intensity value (0-32767)   7000
    dimming value (0-255)   35
F: Calibration point 1.6
    Light intensity value (0-32767)   8000
    dimming value (0-255)   25

(All other parameters can be used in their default setting) The illustration below shows the relation of the measured values and the characteristic.

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3.11.1.5.1/5

00 07 Light 800901
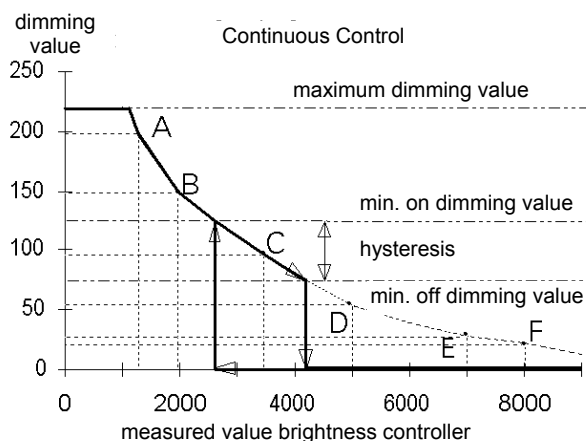
Changing the parameter "Response to min. dimming value" to "do not switch off" results in the below characteristic:
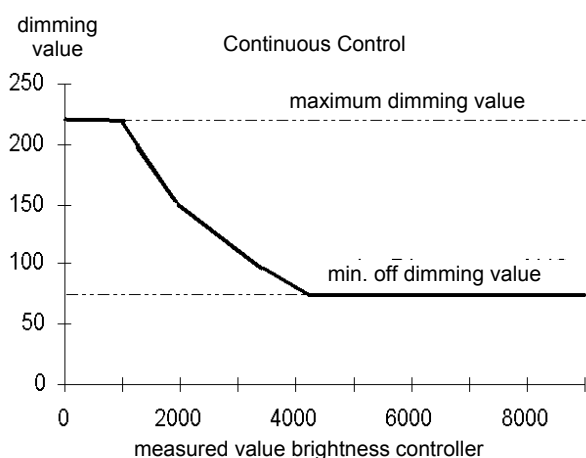

Example

Calibration: determining a characteristic

To make it easier to generate individual characteristics, 3 calibration objects are available. Calibrations are performed at dusk, where the first value is measured at full daylight and the last one at complete darkness. When making the calibration, the sky should be cloudless as changes in the outside light might impair the results. The brightness controller must be protected from the artificial light to avoid feedback.
This procedure is illustrated by the below example:
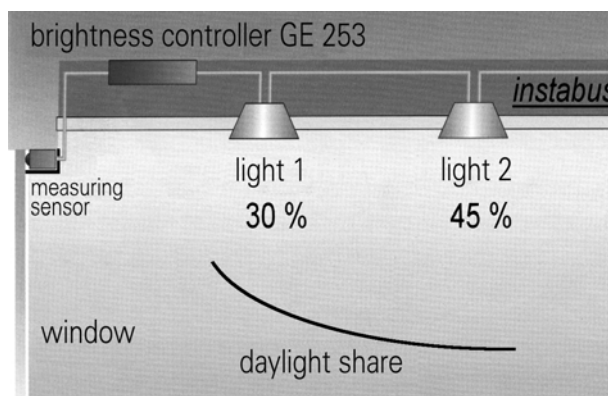
- Start calibration at maximum outside light intensity.
- Define group addresses "Calibration request", "Calibration result light intensity" and "Calibration result dimming value" and assign them to the objects 0, 1 and 2.
- Load the application program to the light intensity control module (default parameter settings).
- Dim light 1 to desired light intensity (check with Lux-meter). Here, the dimming period should be significantly increased (to e.g. 0,5ms * 200 *256 = 25,6 s.)
- Select the group address to "Calibration request" in the group overview window.
- Select the option "Group..." under menu item "Test" in the commissioning section of the ETS 2. Then, write the control number "1" to the field "Value" in the window "Enter value" and send it by clicking on "Write".
- On receiving the calibration request the control module reads the light intensity value from the brightness controller and the dimming value from the switching/dimming actuator and writes them to the calibration results objects.
- Select the group address to "Calibration result light intensity" in the group overview window.
- Change to the window "Read value" under the menu bar item "Test", "Group...", click the button "Read" and note down the light intensity value displayed.
- Select the group address to "Calibration result dimming value" in the group overview window and also read the value and note it down.
  The first calibration point to defining the characteristic is generated.
- Now the same procedure must be used on light 2 to generating a first calibration point. Enter "2" (control 2) when sending the "Calibration request" and repeat the above steps
- This procedure must be repeated periodically (approx. every 15 minutes, once the outside lighting change noticeably) until all eight calibration points to defining the characteristic are generated. The final calibration point

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3.11.1.5.1/6

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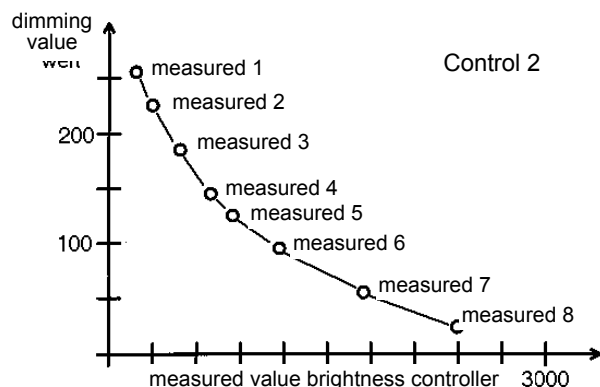
00 07 Light 800901

should be generated when it is completely dark outside.
- To avoid measuring errors, the values measured should be displayed graphically in an appropriate set of co-ordinates.

Calibration result to light 1
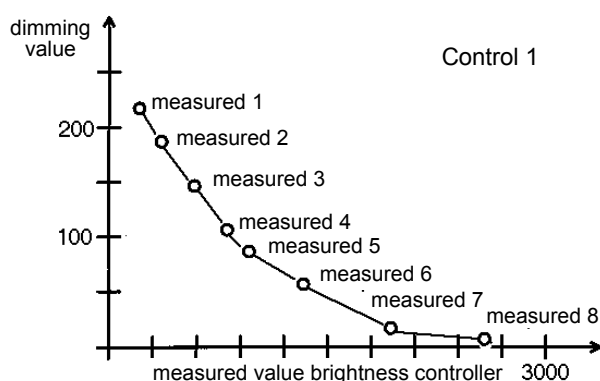
Calibration result to light 2

Now, the results can be written to the corresponding parameters.

Example
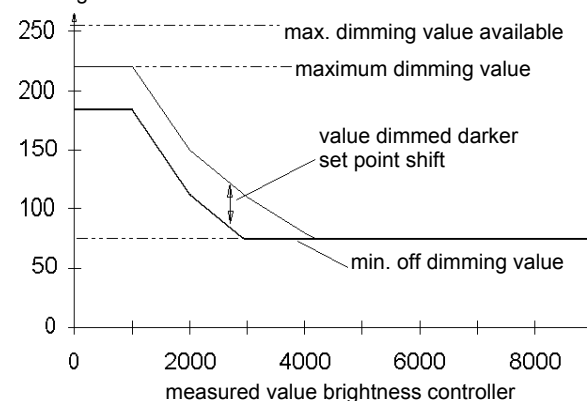
Set point shift by dimming
While dimming manually no further set points are sent to the switching/dimming actuator. On completion the dimming, the control maintains the new light intensity. On releasing the locked control, the original settings are re-established; i.e. the light intensity control module uses the characteristics as specified in the parameter list again. The below illustrations show a shift of the characteristic when dimming brighter and darker.
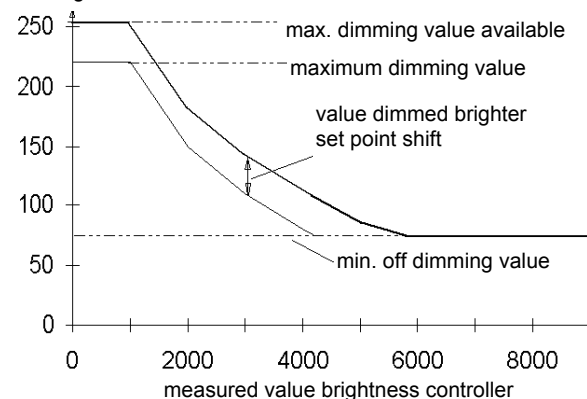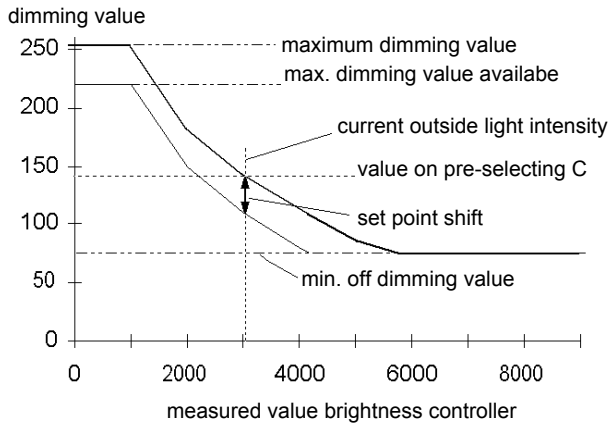

Example

Set point shift by value setting
A push button 4-fold allows you to use a specified value as the dimming value. Then, the light intensity control evaluates the difference between the actual dimming value (which is the value specified to the pre-selection rocker) and the dimming value that was generated last to establish the set point shift. As the light intensity control reads the status of the dimming actuator immediately on receiving a new object status at the object "Set value", the switching/dimming actuator must be set to establishing the dimming value immediately.

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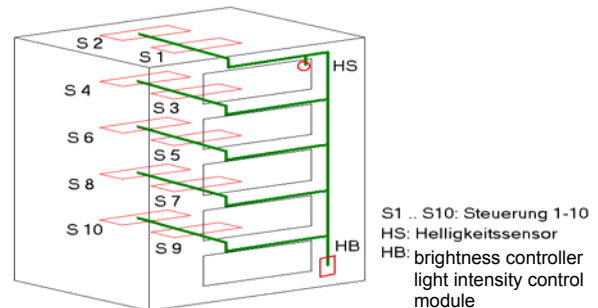
3.11.1.5.1/7

00 07 Light 800901

dimming value

Example

Two step control
When using switching actuators the light intensity control module must be set to "two step control" mode. In this mode the communication objects "Set value x %", "Status" and "Brighten/darken" are not used. The light intensity control recognizes the "two step control" mode because of the first and the second calibration point that must be identical in the "two step control" mode. The third calibration point defines the hysteresis. The parameters "Response to min. dimming value" must be set to "switch off". All other parameters (maximum dimming value, minimum value to dimming on, minimum value to dimming off) are ignored. When using a two step control, the first calibration point defines the light intensity to switching on (parameter 1.1 and parameter 1.2), while the light intensity to switching off is provided by the first calibration point plus the hysteresis (parameter 1.3).

switching value
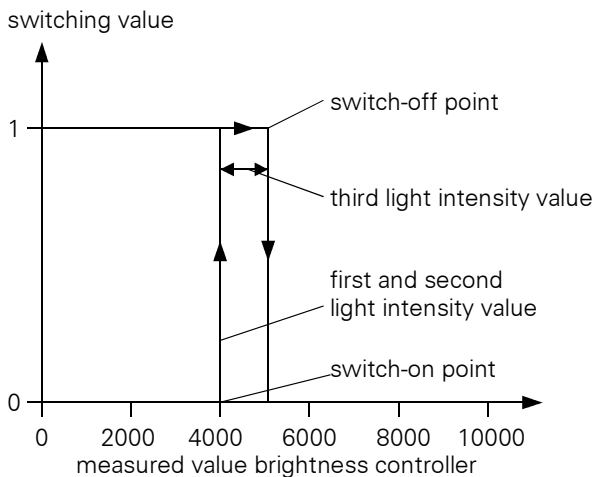
Example

Daylight dependent light control to a building front

S1 .. S10: Steuerung 1-10
HS: Helligkeitssensor
HB: brightness controller light intensity control module

The brightness controller GE 253 measures the outside light intensity (the sensor points outside the window). Therefore the brightness controller must be protected from the artificial lighting to avoid any feedback. As the lighting conditions are almost identical all over the building front, one brightness controller is enough to generate the light intensity value to controlling all lights to that front of the building.
For this example two lights are used per room (see illustration). As the daylight share drops off towards the back of the room, the lights must be controlled by different characteristics. The individual rooms also require individual characteristics as the individual dimming values can distinguish individually (e.g. because of manual switching and dimming).
The 5 rooms in this example require a total of 10 characteristics, i.e. all the characteristics of a light intensity control module.
This example can be extended as desired:
# of light intensity control modules =
# of lights that is to be controlled separately / 10
rounding up the result.