



The brightness sensor is a DIN rail mounted device for insertion in the distribution board. The connection to the EIB is established via a bus connecting terminal.

The supplied light sensor for recording the ambient brightness level is mounted on the outside of the building and connected via two screw terminals.

The brightness sensor can send switching telegrams to EIB actuators when the brightness exceeds or falls below a specified threshold.

Three different threshold values between 1 20,000 lux can be set via the ETS2 program.

Technical Data

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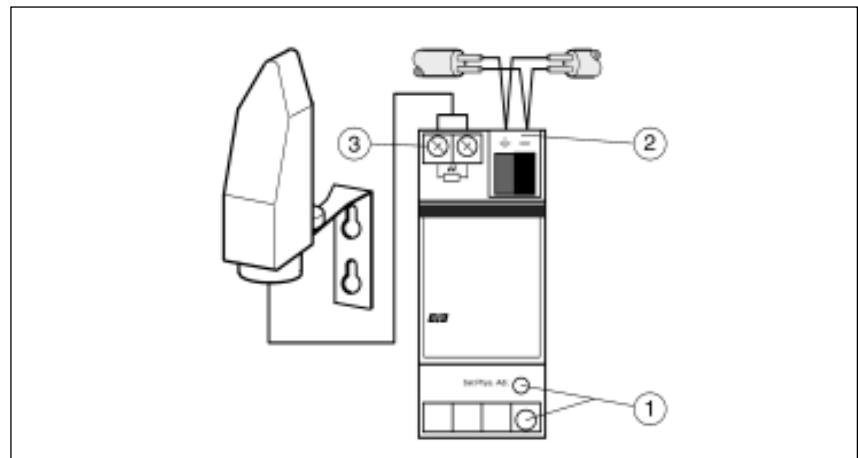
Power supply	– EIB	24 V DC, via the bus line
Inputs	– Brightness ranges	1 ... 100 lux 100 ... 20,000 lux can be selected via software
Operating and display elements	– Cable length – Red LED and push button	max. 100 m for assigning the physical address
Connections	– Light sensor	2 screw terminals Wire range 0.5 ... 2 mm ²
Type of protection	– EIB – Control unit – Light sensor	Pins for bus connecting terminal IP 20, EN 60 529
Ambient temperature range	– Operation of control unit – Operation of light sensor – Storage – Transport	IP 54, EN 60 529 - 5 °C ... 45 °C -40 °C ... 70 °C -25 °C ... 55 °C -25 °C ... 70 °C
Design	– Modular installation device, proM	
Housing, colour	– Plastic housing, grey	
Mounting	– Control unit	on 35 mm mounting rail, DIN EN 50022
Dimensions	– Light sensor	with mounting bracket on vertical surface
Mounting depth/width	– Control unit	86 x 36 x 64 mm (H x W x D)
Weight	– Light sensor	74 / 118 x 27 x 36 / 62 mm (H x W x D)
Certification	– Control unit	68 mm / 2 modules at 18 mm
CE norm	– Control unit	0.180 kg
Special features	– Light sensor	0.04 kg
	– EIB-certified	
	– in accordance with the EMC guideline and the low voltage guideline	
	– Inputs	1, for light sensor

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Application programs	Number of communication objects	Max. number of group addresses	Max. number of associations
Switch Steps Cyclic	4	5	5
Switch Steps Value Cyclic	5	5	5

Circuit diagram

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1 Programming LED and push button
2 Bus connection

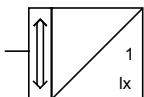
3 Connection for light sensor

Note

The light sensor is fixed with a mounting bracket as supplied to a vertical surface. The intake for the signal cable must point downwards. When selecting the installation site, you should note the following:

The maximum cable length is 100 m. A conventional, two-core cable can be used.

Make sure that the light sensor is not in shadow. If the brightness sensor should be used for switching external lighting, the light sensor should face eastwards. If it is to be used for room lighting, it should preferably face northwards.

Switch Steps Cyclic**Selection in ETS2**

- ABB
 - └ Phys. Sensors
 - └ Brightness

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Switch

The brightness sensor has three 1 bit communication objects which can send "On" or "Off" switching telegrams when the brightness value exceeds or falls below the respective threshold value. It is possible to define separately for an overrange or undershoot of the respective threshold, whether the communication object should send cyclically. A common cyclic time is set for all the channels.

Threshold value

The three threshold values can be set independently in the parameters as resistance values of the light sensors.

Depending on the tolerance of the light sensor, it may be necessary to correct the resistance value that was originally selected. The following table helps in this regard:

Illuminance / lux	Resistance / Ohm
approx. 1	2.4 M
approx. 1.5	2.0 M
approx. 2	1.5 M
approx. 3	1.0 M
approx. 5	700.0 k
approx. 7	460.0 k
approx. 10	340.0 k
approx. 20	200.0 k
approx. 30	140.0 k
approx. 50	100.0 k
approx. 200	30.0 k
approx. 300	19.6 k
approx. 500	12.8 k
approx. 700	10.4 k
approx. 1000	8.4 k
approx. 1500	6.0 k
approx. 2000	5.2 k
approx. 2500	4.0 k
approx. 5000	2.8 k
approx. 7000	2.4 k
approx. 10000	2.0 k

If the current measured value fluctuates by the set threshold value, it can result in frequent switching operations. It is possible to set a common hysteresis for all the channels to prevent this from happening.

The percentage value for this hysteresis refers to the resistance value of the light sensor, whereby the resolution of the brightness sensor must be taken into consideration.

The resolution of the light sensor is 400 Ohm in a range between 1.2 kOhm and 50 kOhm (corresponds to 20000 lux to 100 lux). It is set at 20 kOhm in a range between 50 kOhm and 2.5 MOhm (corresponds to 100 lux to 1 lux).

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The following example serves to clarify the setting of the hysteresis: At a threshold value of 10 kOhm (corresponds to approx. 700 lux), the brightness sensor detects at approx. 10.4 kOhm that it has become darker. If the hysteresis is set at 12.5%, it should detect at approx. 8.75 kOhm that it is lighter. With a resolution of 400 Ohm, the actual threshold lies at 8.4 kOhm. This corresponds to approx. 1000 lux.

Channel selection

The three threshold value objects can be disabled individually or together via object no. 3. The three least significant bits of the 1 byte communication object are evaluated individually.

If a channel is disabled, the communication object is no longer permitted to send any telegrams. If the channel is enabled, the communication object sends a telegram with its current value.

The following table lists the values that must be sent to object no. 3 in order to disable and/or enable specific objects.

Dec.	Binary	Ch.3	Ch.2	Ch.1
0	0000 0000	enab.	enab.	enab.
1	0000 0001	enab.	enab.	disab.
2	0000 0010	enab.	disab.	enab.
3	0000 0011	enab.	disab.	disab.
4	0000 0100	disab.	enab.	enab.
5	0000 0101	disab.	enab.	disab.
6	0000 0110	disab.	block.	enab.
7	0000 0111	disab.	disab.	disab.

If channels 3 and 1 should be enabled and channel 2 should be disabled, telegram 0000 0010 must be sent to object no. 3. This corresponds to the decimal value 2. This value can be sent e.g. using ETS or by a logic module.

To prevent the light from being continually switched in the event of temporary fluctuations, it is possible to define a common delay time for all the channels. The brightness must exceed or fall below the set threshold for this delay time before the brightness sensor may send a telegram. This setting applies for all the channels.

Communication objects

No.	Type	Object name	Function
0	1 bit	Threshold channel 1	Telegr. switch
1	1 bit	Threshold channel 2	Telegr. switch
2	1 bit	Threshold channel 3	Telegr. switch
3	1 byte	Input telegr.	Disable channels 1-3

Parameters

The default setting for the values is **printed in bold type**.

General:

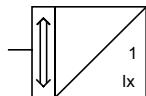
- Interval for cyclical sending
approx. 3 min / **approx. 5 min** /
approx. 10 min / ... / approx. 60 min
- Hysteresis of threshold values 1...3
approx. 25 % / **approx. 12.5 %** /
approx. 6 %
- Delay time when brightness exceeds/falls below threshold
approx. 10 sec. / approx. 20 sec. / ... /
approx. 60 sec. / ... / approx. 3 min

Separate for channel 1 ... channel 3:

- Threshold value
2.0 kOhm, approx. 10000 lux
2.4 kOhm, approx. 7000 lux
...
200 kOhm, approx. 20 lux
...
2.4 MOhm, approx. 1 lux
- When brightness falls below threshold value (-> darker), channel ... sends
no telegram
OFF telegram once
ON telegram once
OFF telegrams cyclically
ON telegrams cyclically
- When brightness exceeds threshold value (-> brighter), channel ... sends
no telegram
OFF telegram once
ON telegram once
OFF telegrams cyclically
ON telegrams cyclically

Behaviour of channels when disabled:

- When disabled, channels 1...3 send
no telegram
- When enabled, channels 1...3 send
current value immediately
- Further information about disabling/enabling channels 1...3 can be found in the ETS application description

Switch Steps Value Cyclic**Selection in ETS2**

- ABB
 - └ Phys. Sensors
 - └ Brightness

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Scene

Using this application program, the brightness sensor can implement lightscene control with four brightness-dependent scenes. Each scene consists of three 1 bit communication objects and a 1 byte communication object. The four lightscenes are differentiated from each other by the three threshold values.

Threshold value

The brightness sensor has a common parameter "Measuring range" to define the threshold values. The two measuring ranges 100 - 20000 lux (50 kOhm ... 1 kOhm) and

1 - 100 lux (2.5 MOhm ... 50 kOhm) can be selected. There is a parameter for each of the three threshold values of "light", "medium" and "dark". The three values must be used in ascending order. Increased resistance values mean reduced illuminance levels due to the characteristic curve of the sensor.

Depending on the tolerance of the light sensor, it may be necessary to correct the resistance value that was originally selected. The following table helps in this regard:

Illuminance / lux	Resistance / Ohm
approx. 1	2.4 M
approx. 1.5	2.0 M
approx. 2	1.5 M
approx. 3	1.0 M
approx. 5	700.0 k
approx. 7	460.0 k
approx. 10	340.0 k
approx. 20	200.0 k
approx. 30	140.0 k
approx. 50	100.0 k
approx. 200	30.0 k
approx. 300	19.6 k
approx. 500	12.8 k
approx. 700	10.4 k
approx. 1000	8.4 k
approx. 1500	6.0 k
approx. 2000	5.2 k
approx. 2500	4.0 k
approx. 5000	2.8 k
approx. 7000	2.4 k
approx. 10000	2.0 k
approx. 20000	1.0 k

If the current measured value fluctuates by the set threshold value, it can result in frequent switching operations. It is possible to set a common hysteresis for all the channels to prevent this from happening.

The percentage value for this hysteresis refers to the resistance value of the light sensor, whereby the resolution of the brightness sensor must be taken into consideration.

The resolution of the light sensor is 400 Ohm in a range between 1.2 kOhm and 50 kOhm (corresponds to 20000 lux to 100 lux). It is set at 20 kOhm in a range between 50 kOhm and 2.5 MOhm (corresponds to 100 lux to 1 lux).

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The following example serves to clarify the setting of the hysteresis: At a threshold value of 10 kOhm (corresponds to approx. 700 lux), the brightness sensor detects at approx. 10.4 kOhm that it has become darker. If the hysteresis is set at 12.5%, it should detect at approx. 8.75 kOhm that it is lighter. With a resolution of 400 Ohm, the actual threshold lies at 8.4 kOhm. This corresponds to approx. 1000 lux.

To prevent the light from being continually switched in the event of temporary fluctuations, it is possible to define a common delay time for all the channels. The value must exceed or fall below the set threshold for this delay time before the brightness sensor may send a telegram. This setting applies for all the channels.

Cyclic

A common setting is selected for all the outputs to determine whether they should send cyclically or only when changing scenes. The cyclic time can be set between 2.5 minutes and 60 minutes.

Switch

For the four scenes "Brighter than threshold 1", "Between threshold 1 and 2", "Between threshold 2 and 3" and "Darker than threshold 3", it is possible to set separately for the 1 bit communication objects whether they should send telegrams. The value of the communication object is set with the following parameter and determines when the output should send a telegram.

Value

In the same way as for the 1 bit communication objects, it is also possible to select for the 1 byte communication object of output 1 when it should send a telegram and which value it should use.

Channel selection

The four communication objects for the outputs can be disabled individually or together via object no. 4. The four least significant bits of the 1 byte communication object are evaluated individually.

If an output is disabled, the communication object is no longer permitted to send any telegrams. If the channel is enabled, the communication object sends a telegram with its current value.

The table below lists the values that must be sent to object no. 4 in order to disable and/or enable specific channels.

If e.g. channels 3 and 1 should be enabled and channels 2 and 4 should be disabled, telegram 0000 0101 must be sent to object no. 4.

This corresponds to the decimal value 5. This value can be sent e.g. using ETS or by a logic module.

Dec.	Binary	Ch.4	Ch.3	Ch.2	Ch.1
0	0000 0000	enab.	enab.	enab.	enab.
1	0000 0001	disab.	enab.	enab.	enab.
2	0000 0010	enab.	enab.	enab.	disab.
3	0000 0011	disab.	enab.	enab.	disab.
4	0000 0100	enab.	enab.	disab.	enab.
5	0000 0101	disab.	enab.	disab.	enab.
6	0000 0110	enab.	enab.	disab.	disab.
7	0000 0111	disab.	enab.	disab.	disab.
8	0000 1000	enab.	disab.	enab.	enab.
9	0000 1001	disab.	disab.	enab.	enab.
10	0000 1010	enab.	disab.	enab.	disab.
11	0000 1011	disab.	disab.	enab.	disab.
12	0000 1100	enab.	disab.	disab.	enab.
13	0000 1101	disab.	disab.	disab.	enab..
14	0000 1110	enab..	disab.	disab.	disab.
15	0000 1111	disab.	disab.	disab.	disab.

Communication objects

No.	Type	Object name	Function
0	1 byte	Output 1	Telegr. value
1	1 bit	Output 2	Telegr. switch
2	1 bit	Output 3	Telegr. switch
3	1 bit	Output 4	Telegr. switch
4	1 byte	Input telegr.	Positive operation

Parameters

The default setting for the values is **printed in bold type**.

General:

– Cyclical sending	yes no
Only if "yes" is selected:	

– Interval for cyclical sending	approx. 3 min / approx. 5 min / approx. 10 min / ... / approx. 60 min
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Threshold values:

– Measuring range	100 - 20000 lux (approx. 50 kOhm...1 kOhm) 1 - 100 lux (approx. 2.5 MOhm...50 kOhm)
Only for measuring range 100-20000 lux:	

– Threshold 1 (light)	1 kOhm (approx. 20000 lux) 1.2 kOhm ...
– Threshold 2 (medium)	2 kOhm (approx. 10000 lux) ...

– Threshold 3 (dark)	50 kOhm (approx. 100 lux) not activated 1 kOhm (approx. 20000 lux) 1.2 kOhm ...
Only for measuring range 1-100 lux:	

– Threshold 1 (light)	5 kOhm (approx. 100 lux) 60 kOhm ...
– Threshold 2 (medium)	2.50 MOhm not activated 50 kOhm (approx. 100 lux) 60 kOhm ...

– Threshold 3 (dark)	90 kOhm (approx. 50lux) ...
– Hysteresis of threshold values 1...3	2.50 MOhm not activated 50 kOhm (approx. 100 lux) 60 kOhm ...

– Delay time when brightness exceeds/falls below threshold	approx. 20 sec. / approx. 30 sec. / ... / approx. 4 min
Separate for the 4 brightness ranges:	
– Channel 1 (switching) sends	no telegram following telegram
Only if telegram is sent:	
–	ON OFF
– Channel 2 (switching) sends	no telegram following telegram
Only if telegram is sent:	
–	ON OFF
– Channel 3 (switching) sends	no telegram following telegram
Only if telegram is sent:	
–	ON OFF
– Channel 4 (value) sends	no telegram following telegram
Only if telegram is sent:	
– Value (0...255)	0
Behaviour of channels 1...3 when disabled:	
– Channel ... (switch) sends	no telegram following telegram once
Only if telegram is sent:	
–	ON OFF
Behaviour of channel 4 when disabled:	
– Channel ... (value) sends	no telegram following telegram once
Only if telegram is sent:	
– Value (0...255)	0
– Further information about disabling/enabling channels 1...3 can be found in the ETS application description	