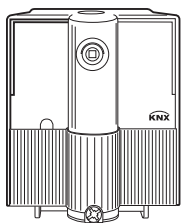


KNX brightness and temperature sensor

Operating instructions



Art. no. 663991

For your safety



DANGER

Risk of fatal injury due to electrical current.

All work on the device should only be carried out by skilled electrician. Observe the country-specific regulations as well as the valid KNX guidelines.

Getting to know the sensor

The KNX brightness and temperature sensor (referred to as **sensor** in the following) is suitable for brightness and temperature measurement in KNX building system technology. The measured values are sent to the bus.

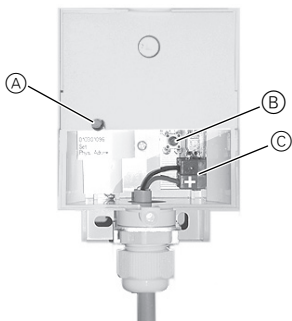
Measurement range for brightness measurement:
1 to 100,000 lux ($\pm 20\%$ or $\pm 5\text{Lux}$)

Measurement range for temperature measurement:
-25°C to +55°C ($\pm 5\%$ or ± 1 degree)



The larger tolerances are applicable for brightness and temperature measurement.

Connections, displays and operating elements



- (A) Programming LED
- (B) Programming button
- (C) Bus connecting terminal

How to install the sensor

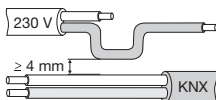


WARNING

Risk of fatal injury from electrical current.

The device could become damaged.

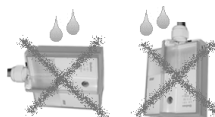
Safety clearance must be guaranteed in accordance with IEC 60664-1. There must be at least 4 mm between the individual cores of the 230 V supply cable and the KNX cable.



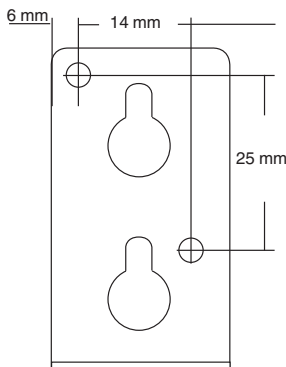
CAUTION

The device could become damaged.

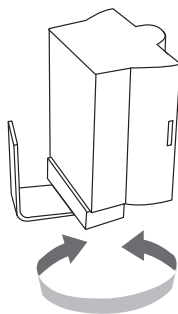
Moisture and dirt can penetrate the housing. This can result in device failure and a short circuit on the bus line. Always install the device vertically with the screw fitting facing downwards.



- ① Fix the sensor.



- ② Align the sensor.



How to connect the sensor

- ① Push the bus cable through the gasket into the terminal compartment.



Observe the correct polarity during connection.

- ② Connect KNX.
- ③ Connect the bus voltage.

The LED flashes.

How to operate the sensor

- ① Press the programming button.

The programming LED lights up.

- ② Load the physical address and application into the device from the ETS.

The programming LED goes out.

The application has been loaded successfully, the device is operative.



When the device is operative, the LED stops flashing approximately 10 seconds after connecting the bus voltage or after loading the application. Otherwise an invalid application program has been loaded.

How to installation and care the cover

Cover installation:

- ① Carefully fit the cover on the installed device.
- ② Screw on the cover.

Cover care:

Clean the cover at regular intervals so that dirt does not generate inaccurate brightness measurement values.



Use a damp cloth for cleaning.

Technical data

KNX:	DC 24 V
Measurement range	
Temperature:	-25°C to +55°C ($\pm 5\%$ or ± 1 degree)
Brightness:	1 to 100,000 lux ($\pm 20\%$ or ± 5 lux)
Power consumption:	< 150 mW
Type of protection	IP 54 when installed vertically
when installed:	with cover

Merten GmbH & Co. KG,

Lösungen für intelligente Gebäude
Service Center, Fritz-Kotz-Straße 8,
Industriegebiet Bomig-West
D-51674 Wiehl

Telefon: +49 2261 702-204

Telefax: +49 2261 702-136

E-Mail: servicecenter@merten.de

Internet: www.merten.de

InfoLine:

Telefon: +49 1805 212581* oder +49 800 63783640

Telefax: +49 1805 212582* oder +49 800 63783630

E-Mail: infoline@merten.de

* kostenpflichtig / fee required

1 Functional characteristics

The weather station measures temperature and brightness.
The measured values can be sent to the bus.

The sensor has 2 different channel types:

- 4 universal channels
- 1 sun protection channel

The **universal channels** can be used for sub-tasks (e.g. only brightness threshold) or for a combination of brightness and temperature.

A channel is made up of up to 2 logically linked weather conditions:

- If the brightness is above/below the threshold AND
- If the temperature is above/below the threshold AND

A non-relevant condition (e.g. temperature) can be set to the value "any" and is then ignored in logical linking.

As a result of the satisfaction or non-satisfaction of this AND link, a telegram is sent to the associated channel object (e.g. channel 1.1). If required, an additional second object (e.g. channel 1.2) can be activated and thus send another telegram.

Each universal channel has one lock object and one teach in object for the brightness threshold.

The **sun protection channel** comprises:

- a dawn/dusk threshold
- up to 3 brightness thresholds
- 3 objects for actuating the drive (up/down – height % – slats %)
- 1 sun control object (morning/evening)
- 1 teach in object
- 1 safety object

The signal for "morning" or "evening" can be triggered either via the sun control object (e.g. via a clock switch) or via the dawn/dusk.

1.1 Benefits

- 2 weather variables can be detected and sent to the bus with a single device.
- All brightness thresholds can be taught in locally if required.

1.2 Special features

Every brightness threshold can be directly programmed via a **teach in object**:

The user sends a byte to the teach in object and the threshold is set to the currently measured brightness (see Appendix: The teach in function).

2 The application program

2.1 Parameter pages

Name	Description
Measured values	Sending the current actual values for brightness and temperature
Channel use	Number and usage of the channels Use of the universal channels C1, C2, C4 and C5: <ul style="list-style-type: none">• with all weather measured values• as mere brightness or temperature thresholds The channel C3 is a mere sun protection channel.
C1, 2, 4, 5 brightness	Setting of the brightness condition
C1, 2, 4, 5 temperature	Setting of the temperature condition
C1, 2, 4, 5 universal	Setting of both measured values – temperature and brightness – for the send condition
C1.1, C2.1, C4.1, C5.1	Telegram type and send behaviour for satisfied and non-satisfied send conditions for C1, 2, 4, 5.
C1.2, C2.2, C4.2, C5.2	Second telegram for C1, 2, 4, 5. Setting of the telegram type for satisfied and non-satisfied send conditions.
C3 thresholds	Setting of the brightness threshold for dawn/dusk and the remaining thresholds (max. 3) for height and/or slat positions. Delay times for increasing and decreasing brightness.
C3 blind	Setting of the desired height and slat positions in case the different thresholds are exceeded.
C3 shutters / textile sun protection	Setting of the relevant height in case the thresholds are exceeded.
C3 value	Setting of the value to be sent in each case if the thresholds are exceeded.
C3 scenes via 1-bit objects	Setting of the scene to be sent in each case if the thresholds are exceeded.

2.2 Communication objects

2.2.1 Object characteristics

The weather station has over 27 communication objects.
 Some objects can assume various functions and names depending on their configuration.

No	Function	Object name	EIS type	Behaviour
0	Physical value	Brightness value	2-byte EIS 5	Send
1	Physical value	Temperature value	2-byte EIS 5	Send
4	Switch Priority Value	C1.1 brightness threshold / temperature threshold / universal channel	EIS 1 EIS 8 EIS 14	Send
5	Switch Priority Value	C1.2 identical to C1.1.	EIS 1 EIS 8 EIS 14	Send
6	Input	C1 lock	1-bit EIS 1	Receive
7	Input	C1 teach in	8-bit EIS 2	Receive
8	Switch Priority Value	C2.1 brightness threshold / temperature threshold / universal channel	EIS 1 EIS 8 EIS 14	Send
9	Switch Priority Value	C2.2 identical to C2.1.	EIS 1 EIS 8 EIS 14	Send
10	Input	C2 lock	1-bit EIS 1	Receive
11	Input	C2 teach in	8-bit EIS 2	Receive
12	Drives up/down	C3 up/down	1-bit EIS 7	Send
13	Height	C3 blinds C3 shutter	EIS 6	Send
	Value	C3 send value	EIS 14	
	Send	Scenes 1 + 2	EIS 1	
14	Position	C3 slats	EIS 2	Send
	Send	Scenes 3 +4	EIS 1	
15	Morning=1 / Evening=0	C3 sun control	1-bit EIS 1	Receive

Continued

No	Function	Object name	EIS type	Behaviour
16	Input	C3 safety	1-bit EIS 1	Receive
17	Input	C3 teach in	8-bit EIS 14	Receive
18	Switch Priority Value	C4.1 brightness threshold / temperature threshold / universal channel	EIS 1 EIS 8 EIS 14	Send
19	Switch Priority Value	C4.2 identical to C1.1.	EIS 1 EIS 8 EIS 14	Send
20	Input	C4 disable	1-bit EIS 1	Receive
21	Input	C4 teach in	8-bit EIS 14	Receive
22	Switch Priority Value	C5.1 brightness threshold / temperature threshold / universal channel	EIS 1 EIS 8 EIS 14	Send
23	Switch Priority Value	C5.2 identical to C5.1.	EIS 1 EIS 8 EIS 14	Send
24	Input	C5 lock	1-bit EIS 1	Receive
25	Input	C5 teach in	8-bit EIS 14	Receive
40	Report	Brightness thresholds	2-byte EIS 5	Send

Number of communication objects:	27
Number of group addresses:	108
Number of associations:	108

2.2.2 Object description

2.2.2.1 Physical values

- **Object 0 "Brightness value"**

Sends the current brightness value either if there is a change in brightness and/or cyclically (depending on the configuration).

Only the value measured directly by the weather station is sent.

Received external actual values (C6, C7) are not considered.

- **Object 1 "Temperature value"**

Sends the current temperature value either if there is a change in brightness and/or cyclically (depending on the configuration).

2.2.2.2 Universal channels C1, C2, C4, C5

- **Object 4, 8, 18, 22 "Cx.1 Brightness threshold", „Cx.1 Temperature threshold“, „Cx.1 Universal channel“**

This is the first output object of a universal channel.

The function of the object depends upon the selected telegram type (see parameter page for first object: C1.1, C2.1, C4.1, C5.1).

Telegram type	Format	Sent telegrams								
Switching command	EIS 1 (On/Off)	On/Off								
Priority	EIS 8	2 Bit Telegram: <table><tr><td><i>Function</i></td><td><i>Value</i></td></tr><tr><td>no priority (no control)</td><td>0</td></tr><tr><td>Priority OFF (control: disable, off)</td><td>2</td></tr><tr><td>Priority ON (control: enable, on)</td><td>3</td></tr></table>	<i>Function</i>	<i>Value</i>	no priority (no control)	0	Priority OFF (control: disable, off)	2	Priority ON (control: enable, on)	3
<i>Function</i>	<i>Value</i>									
no priority (no control)	0									
Priority OFF (control: disable, off)	2									
Priority ON (control: enable, on)	3									
Value	EIS 14 (0-255)	Value between 0 and 255								

- **Object 5, 9, 19, 23 "Cx.2 brightness threshold", "Cx.2 temperature threshold", "Cx.2 universal channel"**

This is the second output object of a universal channel.

This object enables an additional telegram to be sent if required.

If on the parameter page C1.1 (or C2.1 etc.) the parameter *"Should a second telegram be sent?"* is set to YES then a further parameter page (C1.2 or C2.2, C4.2, C5.2 etc.) and the associated object (object 5) are added.

The telegram type can be parameterized independently of the first output object.

The same setting options are available for this purpose as for the first output object (see table above for object 4).

The cycle time and the disabling behaviour are valid together for both objects (objects 4+5).

- **Object 6, 10, 20, 24 "Lock Cx"**

A "1" on the object sets the locked status for the relevant channel - provided the channel has been configured for it.

The behaviour on setting and cancelling the locked status can be selected on the parameter page "C1.1" (or C2.1, C4.1, C5.1).

The locked status can be cancelled again with a "0".

- **Object 7, 11, 21, 24 "Teach in Cx"**

If the value \$80 (128 as a decimal number) is sent to this object then the previously parameterized value for the brightness threshold is replaced by the current actual brightness value and saved.

The newly saved value is sent via object 40 to the bus as confirmation that the teach in process was successful. For further information refer to the Appendix: The teach in function

2.2.2.3 Sun protection channel C3

- **Object 12 "Up/down"**

This object is used to completely open or close the sun protection devices.

0 = raise

1 = lower

- **Object 13 "C3 scenes 1 + 2", "C3 value", "C3 blind", "C3 shutters"**

The function of this object depends on the parameter "*Telegram type*" on the parameter page "C3 blind / shutters / value / scenes".

Telegram type	Format	Sent telegrams												
Send value	EIS 14 8-bit	Sends a value between 0 and 255												
Blind	EIS 2 8-bit	Sends the required blind or shutter height from 0% to 100% to the blind actuator in 1% increments												
Shutters / textile sun protection														
Scenes via 1-bit telegram	EIS 8 1-bit	<p>In this configuration, this object and the following object are used to realize a scene control. 2 scene objects are required to distinguish between 4 scenes, e.g. object 13 + object 14 (or objects 27+28 , objects 34+35). Depending on which object sends which status, one of 4 scenes can be called.</p> <p>Object 13 sends</p> <table><tr><td>Value</td><td>Meaning</td></tr><tr><td>0</td><td>Scene 1</td></tr><tr><td>1</td><td>Scene 2</td></tr></table> <p>Object 14 sends</p> <table><tr><td>Value</td><td>Meaning</td></tr><tr><td>0</td><td>Scene 3</td></tr><tr><td>1</td><td>Scene 4</td></tr></table> <p>The last received telegram is always decisive for the recipient (actuator).</p>	Value	Meaning	0	Scene 1	1	Scene 2	Value	Meaning	0	Scene 3	1	Scene 4
Value	Meaning													
0	Scene 1													
1	Scene 2													
Value	Meaning													
0	Scene 3													
1	Scene 4													

- **Object 14 "C3 slats", "C3 scenes 3+4"**

The function of this object depends on the parameter "*Telegram type*" on the parameter page "C3 blind / shutters / value / scenes". It is only present for blinds and scene control.

Telegram type	Format	Sent telegrams
Blind	EIS 2 8-bit	Sends the required slat position from 0% to 100% in 1% increments to the blind actuator
Scenes via 1-bit telegram	EIS 8 1-bit	See object 13

- **Object 15 "C3 Sun control"**

This object is only present if on the parameter page "*C3 Blind / shutters / value / scenes*" the activation of the sun control is set to "*via object*".

A "1" on the object activates the sun control and the weather station sends the necessary height and position telegrams to the actuator.

The sun control is deactivated with a "0", and the drives are then no longer controlled by the weather station.

- **Object 16 "Safety"**

If safety is set (= 1) then the 2 objects (e.g. C3 height and C3 slats) of the affected channel no longer send. The reaction to the start of safety is left to the actuator.

On cancellation of safety (=0):

During the daytime: the delay timers are re-triggered and the current channel status is re-sent. This means that the actuator is sent the new settings from the weather station after the end of the safety phase.

During the night, the parameters "*Reaction to sun control OFF*" or "*reaction to twilight*" apply depending on what is configured (activation of the sun control via object or dawn/dusk threshold).

The safety telegrams can be generated by a rain and wind sensor.

- **Object 17 "C3 teach in"**

All of the brightness thresholds of a sun protection channel can be taught in with this object. Each threshold is addressed individually.

Teach in code		Threshold
Hex	Dec	
\$80	128	Dawn/dusk threshold
\$81	129	Brightness threshold 1
\$82	130	Brightness threshold 2
\$83	131	Brightness threshold 3

For more detailed information refer to the Appendix: The teach in function .

The newly saved values are sent via object 40 to the bus as confirmation that the teach in process was successful.

2.2.2.4 Feedback object

- **Object 40 "Brightness thresholds"**

This object can send the current settings of the brightness thresholds either automatically or on request.

A request is triggered by sending any value between \$00 and \$7F (or between \$84 and \$FF) to the teach in object.

The values \$80, \$81, \$82, \$83 being reserved for the teach in function.

Feedback options

Situation	Behaviour
After downloading the application	All of the brightness thresholds of all of the channels are sent one after another.
After teaching in a threshold	All of the brightness thresholds of the concerned channel are sent one after another.
On sending a request (on teach in object)	All of the brightness thresholds of the concerned channel are sent one after another.



The brightness thresholds are sent in the same order as they appear in the ETS (see table below)

Thresholds that are not active will not be sent (e.g. brightness threshold 3 as channel was parameterized only with 2 thresholds).

Sending order: After download every used brightness thresholds will be sent

Channel	Threshold	Note
1	Brightness	<i>only if channel was parameterized as a brightness sensor or as an universal channel</i>
2	Brightness	
3	Dawn threshold	<i>is always sent</i>
	Brightness threshold 1	<i>is always sent</i>
	Brightness threshold 2	<i>only if 2 or 3 thresholds were parameterized (Parameter: „how many brightness thresholds“)</i>
	Brightness threshold 3	
4	Brightness	<i>only if channel was parameterized as a brightness sensor or as an universal channel</i>
5	Brightness	



As a result of the restrictions due to EIS5, some values are rounded up or down, so for example the value 10000 Lux may be displayed as either 9999.36 (\$4FA1) or 10004.48 (\$4FA2).

2.3 Parameters

2.3.1 Measured values

Designation	Values	Meaning
Send brightness value in the event of a change of	Not due to a change 10 %, but at least 1 lx 20 %, but at least 1 lx 30 %, but at least 1 lx 50 %, but at least 1 lx	Send only cyclically (if enabled) Only send if the new value differs on more than 10%, 20% etc... from the last sent one. However, if a change of 10% corresponds to a brightness change < 1 lx, then the value is not sent until the change is at least ≥ 1 lx.
Send brightness value cyclically	Do not send cyclically Every minute Every 2 min. Every 3 min. ... Every 30 min. Every 45 min. Every 60 min.	How often should the current brightness value be sent again?
Send temperature in the event of change of	Not due to a change 0.5 °C ... 1.0 °C 2.5 °C	Only send cyclically (if enabled) Send if the value has changed for example by 0.5°C or 1°C since it was last sent.
Send temperature cyclically	Do not send cyclically Every minute Every 2 min. Every 3 min. ... Every 45 min. Every 60 min.	How often should the current temperature be sent again?
Temperature offset in 1/10°C (-64 .. 64)	Manual setting: -64 .. 64	Manual Offset, case sent value differs from the actual ambient temperature. Example: Ambient temp. = 20°C Sent temp.= 22°C Offset = -20 (i.e. 20 x 0,1°C)

2.3.2 Channel use

Designation	Values	Meaning
Function of C1, C2, C4, C5	Brightness sensor Temperature sensor Universal channel	Function of the universal channels: Brightness condition only Temperature condition only Condition with brightness and temperature linked in an AND operation
Function of C3	Sun protection	This channel has fixed settings as sun protection channels, with one dawn/dusk threshold and up to 3 further brightness thresholds for blind or shutter controls

2.3.3 C1, C2, C4, C5 as brightness thresholds

Designation	Values	Meaning
Brightness condition	below 2 lx to over 90,000 lx (in 147 increments)	Should the condition be satisfied when the brightness is <i>below</i> or <i>above</i> the selected value?
Light hysteresis	20 %, but at least 1 lx 30 %, but at least 1 lx 50 %, but at least 1 lx	The hysteresis prevents frequent switching after small changes in brightness. Depending on the selected condition, it can be either negative or positive. Example with 20% hysteresis: Condition: "ABOVE 4500 Lux" = satisfied from 4500 lx and no longer satisfied at 4500 lx - 20% Condition: "Below 4500 Lux" = satisfied below 4500 lx and no longer satisfied at 4500 lx + 20%
Delay when brightness increases	None 5 seconds 10 seconds 20 seconds 30 seconds 1 minute 2 minutes 3 minutes 5 minutes 10 minutes 15 minutes	Response time when it gets lighter and the selected threshold is passed as a result. This setting prevents conflicting telegrams from being sent in response to temporary fluctuations in brightness.
Delay when brightness decreases	None 5 seconds 10 seconds 20 seconds 30 seconds 1 minute 2 minutes 3 minutes 5 minutes 10 minutes 15 minutes	Response time when it gets darker and the selected threshold is passed as a result. This setting prevents conflicting telegrams from being sent in response to temporary fluctuations in brightness.

2.3.4 C1, C2, C4, C5 as temperature thresholds

Designation	Values	Meaning
Temperature condition	below -10°C to over 40°C (in 1K increments)	Should the condition be satisfied when the temperature is <i>below</i> or <i>above</i> the selected value?
Temperature hysteresis	1°C 1.5°C 2°C 2.5°C	The hysteresis prevents frequent switching after small temperature changes. It can be negative or positive depending on the selected condition (above or below xx°C) (see table above: Light hysteresis).

2.3.5 C1, C2, C4, C5 as universal channels

Designation	Values	Meaning
IF brightness	Any below 2 lx to over 90,000 lx (in 147 increments)	Ignore brightness Should the brightness condition be satisfied when the brightness is <i>below</i> or <i>above</i> the selected value?
Light hysteresis	20 %, but at least 1 lx 30 %, but at least 1 lx 50 %, but at least 1 lx	The hysteresis prevents frequent switching after small changes in brightness. Depending on the selected condition, it can be either negative or positive. Example with 20% hysteresis: Condition: "ABOVE 4500 Lux" = satisfied from 4500 lx and no longer satisfied at 4500 lx - 20% Condition: "Below 4500 Lux" = satisfied below 4500 lx and no longer satisfied at 4500 lx + 20%
Delay when brightness increases	None 5 seconds 10 seconds 20 seconds 30 seconds 1 minute 2 minutes 3 minutes 5 minutes 10 minutes 15 minutes	Response time when it gets lighter and the selected threshold is passed as a result. This setting prevents conflicting telegrams from being sent in response to temporary fluctuations in brightness.
Delay when brightness decreases	None 5 seconds 10 seconds 20 seconds 30 seconds 1 minute 2 minutes 3 minutes 5 minutes 10 minutes 15 minutes	Response time when it gets darker and the selected threshold is passed as a result. This setting prevents conflicting telegrams from being sent in response to temporary fluctuations in brightness.
AND temperature	Any below -10°C to over 40°C (in 1K increments)	Ignore the temperature. Should the condition be satisfied when the temperature is <i>below</i> or <i>above</i> the selected value?
Temperature hysteresis	1°C 1.5°C 2°C 2,5°C	The hysteresis prevents frequent switching after small temperature changes. Depending on the selected condition, it can be either negative or positive.

2.3.6 C1.1, C2.1, C4.1, C5.1, and C1.2, C2.2, C4.2, C5.2 (second telegram)

Designation	Values	Meaning
Telegram type C1.1	Switching command Priority Value	1-bit ON/OFF telegram 2-bit EIS 8 1-byte 0 ... 255
If all conditions are met	No telegram, Send following telegram once, Send cyclically	Send behaviour if the weather conditions are satisfied.
Telegram	Switch-off command Switch-on command	For telegram type "Switching command"
	No priority Priority, ON (down) Priority, OFF (up)	For telegram type "Priority"
	Telegram 0 ... 255	For telegram type "Value"
If not all conditions are met	No telegram, Send following telegram once, Send cyclically	Send behaviour if at least one condition is satisfied.
Telegram	Switch-off command Switch-on command	For telegram type "Switching command"
	No priority Priority, ON (down) Priority, OFF (up)	For telegram type "Priority"
	Telegram 0 ... 255	For telegram type "Value"
Cycle time (if used)	Every minute Every 2 min. Every 3 min. Every 5 min. Every 10 min. Every 15 min. Every 20 min. Every 30 min. Every 45 min. Every 60 min.	How often should the telegrams for CX.1 and CX.2 be sent?
Behaviour when setting the lock	Ignore locks	No lock possible
	Do not send	Does not send while the lock object is set.
	Same as for unsatisfied condition	The affected channel behaves as though the condition was not satisfied.

Continued

Designation	Values	Meaning
Behaviour when releasing the lock	Do not send	Not automatically resent when the disable is cancelled
	Update channel	The current channel status is sent immediately as soon as the disable is cancelled.
Should a second telegram be sent?	Yes No	If "Yes" is selected then a new parameter page appears (e.g. C1.2) with a second send object. It can be used to send 2 different telegrams at the same time on the same channel. The cycle time and the disabling behaviour apply jointly to both telegrams (e.g. C1.1 and C1.2).

2.3.7 Sun protection channel: C3 thresholds

Designation	Values	Meaning
Light measurement via	Internal sensor	Fixed setting
Dawn/dusk threshold	2 lx ... 500 lx (in 36 increments)	Threshold for detection of the start/end of the day.
How many brightness thresholds?	1 threshold 2 thresholds 3 thresholds	3 thresholds enable accurate positioning of the blind slats or 3 different shutter positions.
Brightness threshold 1	2000 lx ... 60 klx	The 3 threshold values must be entered in order of magnitude (smallest first) and be separated by at least 4000 lx. Non-permitted values are automatically corrected in the device. (refer to the Appendix, Auto correction of the thresholds for sun protection channels)
Brightness threshold 2	6000 lx ... 70 klx	
Brightness threshold 3	10 klx ... 80 klx	
Delay when brightness increases	10 s (for test purposes only) 1 ... 20 min. (in 1 minute increments)	Only for initial start-up and tests. Response time when it gets lighter and a threshold is passed as a result. This delay prevents conflicting responses from the drives to temporary fluctuations in brightness.
Delay when brightness decreases	10 s (for test purposes only) 5 ... 20 min. (in 1 minute increments)	Only for initial start-up and tests. Response time when it gets darker and a threshold is passed as a result. This delay prevents conflicting responses from the drives to temporary fluctuations in brightness.

2.3.8 C3 blinds

This heading appears on the parameter page of C3 if "Blind" was selected as the telegram type.

Designation	Values	Meaning
Telegram type	Scenes via 1-bit telegrams Send value Blind Shutters / textile sun protection	Purpose of the sun protection channel
Activation of sun control	Via dawn/dusk threshold	The automatic sun control becomes active immediately after the dawn/dusk threshold is exceeded.
	Via object	The automatic sun protection is activated via the relevant sun control object (e.g. via a timer).
Reaction to dawn	Raise & sun control ON	When the dawn/dusk threshold is exceeded the blind is raised and positioned accordingly when the threshold 1 is exceeded. If the value drops below threshold 1 then the blind is raised again.
	Raise & single sun control	As above, except that the blind is not raised again until dusk. The "single" function is used as a calming measure for the facade, to prevent continuous raising and lowering of the drives. See Appendix: Parameter: "SINGLE sun control" (sun protection channels))

Continued

Reaction to sun control ON	<p>Raise & sun control ON</p> <p>Raise & single sun control</p> <p>Not until dawn: start & sun control ON</p>	<p><i>Only visible if the sun control is activated via an object.</i> When the sun control object is set:</p> <p>Raise the blind and position it according to a further threshold.</p> <p>As above, except that the blind is not raised again until the sun control object is reset. The "single" function is used as a calming measure for the facade, to prevent continuous raising and lowering of the drives.</p> <p>The blind is not raised until the sun control object has been set and the dawn/dusk threshold has been exceeded.</p>
Drive height from threshold 1	0% ... 100% (in 2.5% increments)	The blind is lowered once after threshold 1 is exceeded.
Turn slats between threshold 1 and 2	0% ... 100% (in 2.5% increments)	Slat position when threshold 1 is exceeded.
Turn slats between threshold 2 and 3	0% ... 100% (in 2.5% increments)	Slat position when threshold 2 is exceeded.
Turn slats above threshold 3	0% ... 100% (in 2.5% increments)	Slat position when threshold 3 is exceeded.
Reaction to dusk	Sun control OFF & raise, Sun control OFF & lower	Should the blind be raised or lowered in the evening?
Reaction to sun control OFF	<p>Sun control OFF & raise, Sun control OFF & lower, Sun control OFF & lower at dusk/dawn</p>	<p><i>Only visible if the sun control is activated via an object.</i> Upon resetting the sun control object:</p> <p>Raise the blind</p> <p>Lower the blind</p> <p>Do not lower until the light has dropped below the dawn/dusk threshold.</p>

3 Appendix

3.1 *Sun protection channel (C3)*

3.1.1 **Blind application:**

When the threshold 1 is exceeded the blind is lowered via the first object (height), and the slats are moved into a first position via the second object.

When the threshold 2 is exceeded the slats are moved to a second position.

When the threshold 3 is exceeded the slats are moved to a third position.

3.1.2 **Shutters / textile sun protection application:**

When the threshold 1 is exceeded the shutter is moved to a first position via the first object (height).

When the threshold 2 is exceeded the shutter is moved to a second position via the first object (height).

When the threshold 3 is exceeded the shutter is moved to a third position via the first object (height).

The user has the option of reducing the number of thresholds to two or one.

3.2 The teach in function

3.2.1 Principle:

All parameterized brightness thresholds can be directly adapted locally.
The teach in process takes place via a telegram, as a result of which the current measured value replaces the previously parameterized threshold value.

The brightness thresholds are taught in via an object (1 per channel).
Each threshold is addressed via its own teach in code (see table below).

If for example the value \$80 (decimal equivalent: 128) is sent as a teach in command to the teach in object of a **sun protection channel** then the (previously parameterized) value of the dusk/dawn threshold is replaced by the current brightness value, and this new value is saved.
The same applies to the brightness thresholds 1...3 with \$81 to \$83 as the teach in commands.
The values are automatically corrected in the event of an incorrect input – see below: Auto correction of the thresholds for sun protection channels.

With a **universal channel** the brightness threshold is taught in with the code \$81 (129 dec.).
The currently configured selection "above XY Lux" or "below XY Lux" is kept, only the Lux value is changed.

Example: The configuration is > 5000 lx and the teach in object is activated at a brightness of 4000 lx.
Result: The new threshold is now > 4000 lx.

Teach in code and threshold values for sun protection channels

Teach in code		Threshold	Lower threshold	Upper threshold
Hex	Dec			
\$80	128	Dawn/dusk threshold	2 lx	500 lx
\$81	129	Threshold 1	2 klx	60 klx
\$82	130	Threshold 2	6 klx	70 klx
\$83	131	Threshold 3	10 klx	80 klx

Teach in code and threshold values for universal channels

Teach in command	Threshold	Lower limit	Upper limit
\$81	Brightness condition	2 lx	90 klx

3.2.2 Auto correction of the thresholds for sun protection channels



The values which are to be taught in must be in the right order in relation to each other, and they must be separated by at least 4000 lx.

The teach in brightness threshold 3 must be greater than the brightness threshold 2, which in turn must be greater than the brightness threshold 1 etc.

If this is not the case then the values are corrected according to the following rule:

The last threshold to have been taught in determines the others if the difference between the thresholds was too small.

If a value is taught in for threshold 3 which is < threshold 2, then thresholds 1 and 2 are lowered accordingly.

If the values fall below the lower limits (or above the upper limit for dawn) then they should apply as parameters.

The automatic correction is only concerned with the lower limits.

(Exception: dawn/dusk threshold)

During teach in

If the teach in values are not OK then only the last one is valid – the others are adapted to it.

If the last entry is unusable then the thresholds in the table apply.

Threshold	Lower limit	Upper limit
Dawn/dusk threshold	2 lx	500 lx
Threshold 1	2 klx	60 klx
Threshold 2	6 klx	70 klx
Threshold 3	10 klx	80 klx

After downloading the application:

If the distance between the thresholds is too small then threshold 1 is taken as a reference and the others are made to follow it.

3.3 Parameter: "SINGLE sun control" (sun protection channels)

The "single" function is used as a calming measure for the facade, to prevent continuous raising and lowering of the drives.

3.3.1 For a blind:

When the first threshold is exceeded the blind is lowered to the parameterized height, where it then remains for the whole day. It is not moved again until dusk (or via the sun control object). However, the slats are still continuously repositioned using the current brightness value.

3.3.2 For shutters / value / scenes

It only leads to a telegram if the next-higher threshold is exceeded.

If the value drops below one of the three thresholds then no telegram is sent.

Accordingly, the shutter is lowered further and further as it gets lighter and stops at the position where it is when it starts to get a little darker. All other settings are made directly and manually by the user.

Similarly to the blind, the shutter is not moved again until dusk (or via the sun control object).

- With normal sun protection, the drives are already raised if the value drops below threshold 1.
- A telegram is always sent at the start and end of the day (raising, lowering), whether as a result of passing the dawn/dusk threshold or through the receipt of a sun control telegram.
- This telegram is also sent in the evening if the threshold 1 was not exceeded during the daytime and therefore no conflicting telegram was sent.