

EIB Weather station



132 9 201



132 9 200

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	132 9 201

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# 1 Functional characteristics

The weather station measures temperature, brightness and wind speed.

In addition, a rain sensor (rain / no rain) is installed in the form of 2 metal rods (131 9 200) or in the form of a special printed circuit board (131 9 201).

The measured values and the rain status can be sent to the bus.

The weather station has 2 different channel types:

- universal channels
- the sun protection channels

The **universal channels** can be used for sub-tasks (e.g. a pure brightness threshold) or for a free combination of measured variables.

A channel is made up of up to 4 logically linked weather conditions:

- If the brightness is above/below the threshold AND
- If the temperature is above/below the threshold AND
- If the wind speed is above/below the threshold AND
- If rain is present / not present

A non-relevant condition (e.g. temperature) can be set to the value "any" and is then ignored during 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 sent as well.

Each universal channel has one lock object and one teach in object.

If required, a universal channel can also be parameterized as a **safety channel**.

Here, the relevant variables – i.e. temperature, rain and wind – are linked with an OR operation.

A **sun protection channel** comprises:

- a dawn/dusk threshold
- 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 detected either via the sun control object (e.g. via a timer) or via the dawn/dusk.

## 1.1 Benefits

- All weather variables can be detected and sent to the bus with a single device.
- All brightness thresholds can be taught in locally if required.
- The brightness on other facades can also be measured via 2 objects.

## 1.2 Special features

Any 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 ).

In order to optimise facade-specific shading, the current brightness value for the other two facades (east and west) can be received via the bus if required.

2 external brightness sensors (Lu131, order no. 131 9 200) can be used for this purpose.

## 1.3 Important information

- The rain measuring sensor can get hot during operation.
- Rain can only be detected when raindrops fall on the measuring sensor and cause a short circuit at a any point between the two rods or two tracks on the printed board. Therefore there may be a certain time delay between the first drops of rain in a shower and the time when a raindrop actually lands on the rain sensor.
- Despite the sensor heating, when it stops raining it can take several minutes to dry out the measuring sensor and for the device to detect that the rain has stopped.
- As it can take several minutes to retract the sun / sight protection devices (blinds, shutters etc.), they are not immediately protected if the wind picks up suddenly. **Therefore, take the maximum permissible wind speed specified by the manufacturer into account when parameterizing the wind threshold,** and set the threshold below this value to be on the safe side.

## 2 The application program "Weather station V1.2"

### 2.1 Selection in the product database

<b>Manufacturer</b>	<a href="#">Theben AG</a>
<b>Product family</b>	Physical sensors
<b>Product type</b>	Weather station
<b>Program name</b>	Weather station V1.2

Download the application from: <http://www.theben.de>

## 2.2 Parameter pages

Table 1

Name	Description
<b><i>Measured values</i></b>	Sending the current actual values for wind speed, brightness, temperature, rain
<b><i>Channel use</i></b>	Number and usage of the channels Use of the universal channels C1, C2, C4 and C5: <ul style="list-style-type: none"> <li>• with all weather measured values</li> <li>• as pure brightness or temperature thresholds</li> <li>• as generators of safety telegrams</li> </ul> The channels C3, C6 and C7 are pure sun protection channels.
<b><i>C1, 2, 4, 5 brightness</i></b>	Setting of the brightness condition
<b><i>C1, 2, 4, 5 temperature</i></b>	Setting of the temperature condition
<b><i>C1, 2, 4, 5 safety</i></b>	Setting of the conditions for generating a safety telegram depending on wind, frost or rain
<b><i>C1, 2, 4, 5 universal</i></b>	Setting of all 4 measured values – wind, temperature, brightness and rain – for the send condition
<b><i>C1.1, C2.1, C4.1, C5.1</i></b>	Telegram type and send behaviour for satisfied and non-satisfied send conditions for C1, 2, 4, 5.
<b><i>C1.2, C2.2, C4.2, C5.2</i></b>	Second telegram for C1, 2, 4, 5. Setting of the telegram type for satisfied and non-satisfied send conditions.
<b><i>C3, 6, 7 thresholds</i></b>	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.
<b><i>C3, 6, 7 blind</i></b>	Setting of the desired height and slat positions in case the different thresholds are exceeded.
<b><i>C3, 6, 7 shutters / textile sun protection</i></b>	Setting of the relevant height in case the thresholds are exceeded.
<b><i>C3, 6, 7 value</i></b>	Setting of the value to be sent in each case if the thresholds are exceeded.
<b><i>C3, 6, 7 scenes via 1-bit objects</i></b>	Setting of the scene to be sent in each case if the thresholds are exceeded.

## 2.3 Communication objects

### 2.3.1 Object characteristics

The weather station has over 41 communication objects.  
Some objects can assume various functions and names depending on their configuration.

Table 2

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
2	Physical value	Wind speed	2-byte EIS 5	Send
3	Rain / no rain	Rain sensor	1-bit EIS 1	Send
4	Switch Priority Value	C1.1 brightness threshold / temperature threshold / universal channel	EIS 1 EIS 8 EIS 14	Send
	Send	C1 safety	EIS 1	Send
5	Switch Priority Value	C1.2 identical to C1.1. (object not present for safety)	EIS 1 EIS 8 EIS 14	Send
6	Input	C1 lock	1-bit EIS 1	Receive
7	Input	C1 learn	8-bit EIS 2	Receive
8	Switch Priority Value	C2.1 brightness threshold / temperature threshold / universal channel	EIS 1 EIS 8 EIS 14	Send
	Send	C2 safety	EIS 1	Send
9	Switch Priority Value	C2.2 identical to C2.1. (object not present for safety)	EIS 1 EIS 8 EIS 14	Send
10	Input	C2 lock	1-bit EIS 1	Receive
11	Input	C2 learn	8-bit EIS 2	Receive
12	Drives up/down	C3 up/down	1-bit EIS 7	Send

Continued

No.	Function	Object name	EIS type	Behaviour
<b>13</b>	Height	C3 blinds C3 shutter	EIS 2	Send
	Value	C3 send value	EIS 14	
	Send	Scenes 1 + 2	EIS 1	
<b>14</b>	Position	C3 slats	EIS 2	Send
	Send	Scenes 3 +4	EIS 1	
<b>15</b>	Morning=1 / Evening=0	C3 sun control	1-bit EIS 1	Receive
<b>16</b>	Input	C3 safety	1-bit EIS 1	Receive
<b>17</b>	Input	C3 learn	8-bit EIS 14	Receive
<b>18</b>	Switch Priority Value	C4.1 brightness threshold / temperature threshold / universal channel	EIS 1 EIS 8 EIS 14	Send
	Send	C4 safety	EIS 1	Send
<b>19</b>	Switch Priority Value	C4.2 identical to C1.1. (object not present for safety)	EIS 1 EIS 8 EIS 14	Send
<b>20</b>	Input	C4 disable	1-bit EIS 1	Receive
<b>21</b>	Input	C4 learn	8-bit EIS 14	Receive
<b>22</b>	Switch Priority Value	C5.1 brightness threshold / temperature threshold / universal channel	EIS 1 EIS 8 EIS 14	Send
	Send	C5 safety	EIS 1	Send
<b>23</b>	Switch Priority Value	C5.2 identical to C5.1. (object not present for safety)	EIS 1 EIS 8 EIS 14	Send
<b>24</b>	Input	C5 lock	1-bit EIS 1	Receive
<b>25</b>	Input	C5 learn	8-bit EIS 14	Receive
<b>26</b>	Drives up/down	C6 up/down	1-bit EIS 7	Send
<b>27</b>	Height	C6 blinds C6 shutter	EIS 2	Send
	Valuator	C6 send value	EIS 2	
	Send	Scenes 1 + 2	EIS 1	
<b>28</b>	Position	C6 Slats	EIS 2	Send
	Send	Scenes 3 +4	EIS 1	



Continued

No.	Function	Object name	EIS type	Behaviour
<b>29</b>	Morning=1 / Evening=0	C6 sun control	1-bit EIS 1	Receive
<b>30</b>	Input	C6 safety	1-bit EIS 1	Receive
<b>31</b>	Input	C6 external Lux value	2-byte EIS 5	Receive
<b>32</b>	Input	C6 learn	8-bit EIS 14	Receive
<b>33</b>	Drives up/down	C7 up/down	1-bit EIS 7	Send
<b>34</b>	Height	C7 blinds C7 shutter	EIS 6	Send
	Value	C7 send value	EIS 2	
	Send	Scenes 1 + 2	EIS 1	
<b>35</b>	Position	C7 slats	EIS 6	Send
	Send	Scenes 3 +4	EIS 1	
<b>36</b>	Morning=1 / Evening=0	C7 sun control	1-bit EIS 1	Receive
<b>37</b>	Input	C7 safety	1-bit EIS 1	Receive
<b>38</b>	Input	C7 external Lux value	2-byte EIS 5	Receive
<b>39</b>	Input	C7 learn	8-bit EIS 2	Receive
<b>40</b>	Report	Brightness thresholds	2-byte EIS 5	Send

**Table 3**

Number of communication objects:	41
Number of group addresses:	108
Number of associations:	108

## **2.3.2 Object description**

### **2.3.2.1 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).

- **Object 2 "Wind speed"**

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

The units (**m/s** or **km/h**) can be chosen on the “Measured values” parameter page.

- **Object 3 "Rain sensor"**

This 1-bit object sends the current rain status – "1" for "rain" and "0" for "no rain".

Depending on how it is configured, it can be sent only when the status has changed, or after a change, or cyclically.

### 2.3.2.2 Universal channels C1, C2, C4, C5

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

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).

Table 4

Telegram type	Format	Sent telegrams	
Switching command	EIS 1 (On/Off)	On/Off	
Priority	EIS 8	2 Bit Telegram:	
		<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	

If the relevant channel is configured as a **safety channel** then this object sends 1-bit telegrams: 0 = safety inactive, 1 = safety status active.

- **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).

If the relevant channel is configured as a safety channel then only object 4 is used. Object 5 (or object 9, 19, 23) and the additional parameter page are omitted.

- **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

### 2.3.2.3 Sun protection channels C3, C6, C7

- **Object 12, 26, 33 "Up/down"**

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

0 = raise

1 = lower

- **Object 13, 27, 34 "Cx scenes 1 + 2", "Cx value", "Cx blind", "Cx shutters"**

The function of this object depends on the parameter "*Telegram type*" on the parameter page "C3 (or C6,C7) blind / shutters / value / scenes".

**Table 5**

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.</p> <p>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><th>Value</th><th>Meaning</th></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><th>Value</th><th>Meaning</th></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, 28, 35 "Cx slats", "Cx scenes 3+4"**

The function of this object depends on the parameter "*Telegram type*" on the parameter page "C3 (or C6,C7) blind / shutters / value / scenes". It is only present for blinds and scene control.

**Table 6**

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, 29, 36 "C3, C6, C7 Sun control"**

This object is only present if on the parameter page "*C3 (or C6,C7) 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, 30, 37 "Safety"**

The signal for safety can be sourced via the bus from one of the channels C1, C2, C4 or C5. In order to use this, the object 16 (or 30, 37) is put onto the same group address as the channel which is used for safety (see example below).

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

**Example:** C1 is configured as a safety channel and is to serve as a safety sensor for the sun protection channels:

During configuration, only the objects 16, 30 and 37 need to be linked to the same group address as object 4.

- **Object 17, 32, 39 "C3, C6, C7 teach in"**

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

**Table 7**

Teach in code		Threshold
Hex	Dec	
<b>\$80</b>	<b>128</b>	Dawn/dusk threshold
<b>\$81</b>	<b>129</b>	Threshold 1
<b>\$82</b>	<b>130</b>	Threshold 2
<b>\$83</b>	<b>131</b>	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.

- **Object 31, 38 "C6, C7 external Lux value"**

These objects receive the current brightness value in EIS 5 format.

The affected channel then only operates with the received value, and no longer uses the one which was measured internally.

With object 31, C6 can work with the brightness value measured on a different facade, e.g. via a Luna 131 (order no. 131 9 200).

Object 38 stands for C7.

The objects are available when the parameter "*Light measurement via*" has been set to "*Light measurement via object C6/C7 external Lux value*" on the parameter pages "*C6/C7 thresholds*".

### 2.3.2.4 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.

**Table 8: Feedback options**

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

**Notes:**

- 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).

**Tabelle 9: Sending order: After download every used brightness thresholds will be sent**

Channel	Threshold	Note
1	Brightness	<i>only if channel was parametrized as a brightness sensor or as an universal channel</i>
2	Brightness	<i>only if channel was parametrized as a brightness sensor or as an universal channel</i>
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 parametrized</i>
	Brightness threshold 3	<i>(Parameter: „how many brightness thresholds“)</i>
4	Brightness	<i>only if channel was parametrized as a brightness sensor or as an universal channel</i>
5	Brightness	<i>only if channel was parametrized as a brightness sensor or as an universal channel</i>
6	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 parametrized</i>
	Brightness threshold 3	<i>(Parameter: „how many brightness thresholds“)</i>
7	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 parametrized</i>
	Brightness threshold 3	<i>(Parameter: „how many brightness thresholds“)</i>

**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).**



## 2.4 Parameters

### 2.4.1 Measured values

Table 10

Designation	Values	Meaning
Send wind speed in the event of a change of ...	Not due to a change  20 %, but at least 1 m/s 30 %, but at least 1 m/s 50 %, but at least 1 m/s	Only send cyclically (if enabled) Send if the value has changed by 20%, 30% or 50% since it was last sent.
Send wind speed in	m/s km/h	Unit for wind speed telegrams
Send wind speed cyclically	Do not send cyclically 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 current wind speed be sent again?
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	See above (Send wind speed in the event of a change of...) 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 5 min. Every 10 min. Every 15 min. Every 20 min. Every 30 min. Every 45 min. Every 60 min.	How often should the current brightness value be sent again?

Continued

Designation	Values	Meaning
Send temperature in the event of change of	Not due to a change 0.5 °C 1.0 °C 1.5 °C 2.0 °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 5 min. ... Every 30 min. Every 45 min. Every 60 min.	How often should the current temperature be sent again?
ONLY for 132 9 201 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) → <i>Function not implemented in type 132 9 200</i>
Send rain on change and	not cyclically  Every minute Every 2 min. Every 3 min. Every 5 min. ... Every 30 min. Every 45 min. Every 60 min.	Send rain status on every change  Send rain status on every change and cyclically
ONLY for 132 9 201 Delay after rain stop	None  1 minute 2 minutes 3 minutes 5 minutes 10 minutes 15 minutes	After rain is over, send immediately rain status = 0  When rain is over, wait before sending rain status = 0  → <i>Function not implemented in type 132 9 200</i>

## 2.4.2 Channel use

Table 11

Designation	Values	Meaning
Function of C1, C2, C4, C5	Brightness sensor Temperature sensor Safety  Universal channel	Function of the universal channels: Brightness condition only Temperature condition only Send safety telegrams for wind, frost or rain*.  Condition with brightness, wind, temperature and rain linked in an AND operation
Function of C3, C6, C7	Sun protection	These channels have fixed settings as sun protection channels, each with one dawn/dusk threshold and up to 3 further brightness thresholds for blind or shutter controls

\* For use with the sun protection channels refer to object 16 safety .

### 2.4.3 C1, C2, C4, C5 as brightness thresholds

Table 12

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.  <b>Example</b> 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.

#### 2.4.4 C1, C2, C4, C5 as temperature thresholds

Table 13

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

### 2.4.5 C1, C2, C4, C5 as safety channels

In contrast to all the other applications of these channels, in this case the conditions are all linked by OR OPERATION.

A safety channel only sends 1-bit commands (0 or 1).

**Table 14**

Designation	Values	Meaning
Safety telegram (ON) in the event of wind	Any  above 5 m/s (18 km/h) to above 28 m/s (approx. 101 km/h) (in 1 m/s increments)	If the wind is not safety relevant.  Minimum wind speed above which a safety telegram (ON) is to be sent.  <b>Notice:</b> The wind threshold has an OFF-delay of 3 Minutes.
OR temperature	Any  below –10°C to over 40°C (in 1K increments)	If the temperature is not safety relevant.  Temperature below which a safety telegram (ON) is to be sent.
OR rain condition	Any Rain	If the rain is not safety relevant.
Send safety telegram cyclically	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 safety telegrams be sent again?

## 2.4.6 C1, C2, C4, C5 as universal channels

Table 15

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.  <b>Example</b> 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.

Continued

Designation	Values	Meaning
AND wind speed	Any  below 4 m/s to over 40 m/s (in 1 m/s increments)	Ignore the wind.  Should the condition be satisfied when the wind speed is <i>below</i> or <i>above</i> the selected value?  <b>Notice:</b> The wind threshold has an OFF-delay of 3 Minutes.
Wind off-delay	None  5 seconds 10 seconds 20 seconds 30 seconds 1 minute 2 minutes 3 minutes 5 minutes 10 minutes 15 minutes	Only recommended for testing purposes.  Delay time after the wind has died down and passed through the threshold as a result. The passing of the threshold is not taken into account until the delay has elapsed.
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.
AND rain condition	No rain  Rain  Any	The condition is satisfied:  when it does not rain  when it rains  ignore the rain  <b>Notice:</b> The rain condition shares the OFF-delay set on parameter page <i>measured values (delay after rain stop)</i> .



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

Table 16

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  Update channel	Not automatically resent when the disable is cancelled  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).

## 2.4.8 Sun protection channels: C3, 6, 7 thresholds

Table 17

Designation	Values	Meaning
Light measurement via	Internal sensor  Object C6 external Lux value Object C7 external Lux value	Fixed setting for C3.  C6 and 7 can receive the current Lux value optionally via the internal sensor or via the bus from an external brightness sensor. This allows the system to measure the light selectively for each façade.
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 <b>3 thresholds</b>	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, <u>Auto correction of thresholds for sun protection channels</u> )
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.

## 2.4.9 C3, 6, 7 blinds

This heading appears on the parameter page of C3 (or C6,C7) if “Blind” was selected as the telegram type.

**Table 18**

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: <u>Parameter: "Single sun control" (sun protection channels)</u>

Continued

Reaction to sun control ON	Raise & sun control ON	<i>Only visible if the sun control is activated via an object.</i> When the sun control object is set:  Raise the blind and position it according to a further threshold.
	Raise & single sun control	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.
	Not until dawn: start & sun control ON	The blind is not raised until the sun control object has been set and the dawn/dusk threshold has been exceeded.
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		<i>Only visible if the sun control is activated via an object.</i> Upon resetting the sun control object:
	Sun control OFF & raise,	Raise the blind
	Sun control OFF & lower, Sun control OFF & lower at dusk/dawn	Lower the blind  Do not lower until the light has dropped below the dawn/dusk threshold.

## 3 Appendix

### ***3.1 Special case – safety channel***

If a universal channel is configured as a safety channel then the weather conditions are linked by a logical OR operation.

Safety is active if there is wind OR frost OR rain.

Unused conditions can be set on “don’t care”

### ***3.2 Sun protection channels (C3, C6, C7)***

#### **3.2.1 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.

#### **3.2.2 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.

### 3.3 The teach in function

#### 3.3.1 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.

**Table 19: Teach in code and threshold values for sun protection channels**

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

**Table 20: Teach in code and threshold values for universal channels**

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

### 3.3.2 Auto correction of the thresholds for sun protection channels

**IMPORTANT:** 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.

**Table 21**

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.



### **3.4 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.

#### **3.4.1 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.

#### **3.4.2 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.