Contents

1. General informations

1.1 Basic information about KNX/EIB-BUS

The **B.E.G.** KNX actuators for blinds receive their operating voltage from the 230V mains. At the same time, telegrams are transmitted and received through the KNX bus connection.
To this end, the communications objects for the actuator for blinds must be connected to the desired communication objects of the other sensors.
Settings are made using the ETS 3/4 programming software. A KNX commissioning and project planning course is required for these instructions to be understood.
Before you can work with them, **B.E.G.** applications need to be imported into the ETS software. The applications may be imported using the menu in the ETS software: File → Import, then select and import application.

Attention:
It is important to check the objects' data types. For instance, a one-bit object can only work with a one-bit object from another device.

1.2 Application versions

Application version: KNX WTS-GPS 1.0

Articel number:
90221 KNX WTS-GPS

1.3 Symbols

The following different symbols are employed for a better overview in the following description of the application. The symbols are explained in brief below.

Attention:
This symbol draws attention to passages of text that are required reading in order to prevent project planning and commissioning errors.

Recommendation:
This symbol indicates parameters to be set, for example, that will enable the device to be used in the best way possible. This symbol indicates parameters to be set, for example, that will enable the device to be used in the best way possible.

2. Transmission protocol

Units:

Temperatures in degrees Celsius
Brightness in lux
Wind in metres per second
Azimuth and elevation in degrees

2.1 List of all communications objects

Abbreviations Flags:

C Communication
R Read
W Write
T Transfer
U Update

Nr.	Name	Function	DPT	Flags
0	Signal LED	Input	1.002	C R W
1	GPS date	Input / Output	11.001	C R W T
	Date	Input / Output	11.001	C R W T
2	GPS time	Input / Output	10.001	C R W T
	Time	Input / Output	10.001	C R W T
3	Date and time request	Input	1.017	C R W
4	GPS malfunction (0 = OK | 1 = NOT OK)	Output	1.002	C R T
5	Location eastern longitude [°]	Output (DPT 14.007)	14.007	C R T
6	Location northern latitude [°]	Output (DPT 14.007)	14.007	C R T
7	Rain: Switching output 1	Output	1.002	C R T
8	Rain: Switching output 2	Output	1.002	C R T
9	Rain: Switching delay to rain	Input	7.005	C R W
10	Rain: Switching delay to no rain	Input	7.005	C R W
	No Rain			
11	Night: Switching output	Output	1.002	C R T
12	Night: Switching delay to night	Input	7.005	C R W
13	Night: Switching delay to non-night	Input	7.005	C R W
14	Temperature measurement value	Output	9.001	C R T
15	Temperature measurement value requirement min./max.	Input	1.017	C R W
16	Temperature measurement value minimum	Output	9.001	C R T
17	Temperature measurement value maximum	Output	9.001	C R T
18	Temperature measurement value reset min./max.	Input	1.017	C R W
19	Temperature sensor malfunction (0 = OK | 1 = NOT OK)	Output	1.002	C R T
20	Temperature TV 1: Absolute value	Input / Output	9.001	C R W T U
21	Temerature TV 1: Change (1:+ | 0: -)	Input	1.002	C R W
22	Temperature TV 1: Switching delay from 0 to 1	Input	7.005	C R W
23	Temperature TV 1: Switching delay from 1 to 0	Input	7.005	C R W
24	Temperature TV 1: Switching output	Output	1.002	C R T
25	Temperature TV 1: Switching output block	Input	1.002	C R W
26	Temperature TV 2: Absolute value	Input / Output	9.001	C R W T U
27	Tempera-ture TV 2: Change (1:+ | 0: -)	Input	1.002	C R W
28	Temperature TV 2: Switching delay from 0 to 1	Input	7.005	C R W
29	Temperature TV 2: Switching delay from 1 to 0	Input	7.005	C R W
30	Temperature TV 2: Switching output	Output	1.002	C R T
31	Temperature TV 2: Switching output block	Input	1.002	C R W
32	Temperature TV 3: Absolute value	Input / Output	9.001	C R W T U
33	Tempera-ture TV 3: Change (1:+ | 0: -)	Input	1.002	C R W
34	Temperature TV 3: Switching delay from 0 to 1	Input	7.005	C R W
35	Temperature TV 3: Switching delay from 1 to 0	Input	7.005	C R W
36	Temperature TV 3: Switching output	Output	1.002	C R T
37	Temperature TV 3: Switching output block	Input	1.002	C R W
38	Temperature TV 4: Absolute value	Input / Output	9.001	C R W T U

Nr.	Name	Funktion	DPT	Flags
152	Wochenschaltuhr Dienstag 4: Schaltausgang	Ausgang	1.002	K L Ü
153	Wochenschaltuhr Mittwoch 1: Schaltausgang	Ausgang	1.002	K L Ü
154	Wochenschaltuhr Mittwoch 2: Schaltausgang	Ausgang	1.002	K L Ü
155	Wochenschaltuhr Mittwoch 3: Schaltausgang	Ausgang	1.002	K L Ü
156	Wochenschaltuhr Mittwoch 4: Schaltausgang	Ausgang	1.002	K L Ü
157	Wochenschaltuhr Donnerstag 1: Schaltausgang	Ausgang	1.002	K L Ü
158	Wochenschaltuhr Donnerstag 2: Schaltausgang	Ausgang	1.002	K L Ü
159	Wochenschaltuhr Donnerstag 3: Schaltausgang	Ausgang	1.002	K L Ü
160	Wochenschaltuhr Donnerstag 4: Schaltausgang	Ausgang	1.002	K L Ü
161	Wochenschaltuhr Freitag 1: Schaltausgang	Ausgang	1.002	K L Ü
162	Wochenschaltuhr Freitag 2: Schaltausgang	Ausgang	1.002	K L Ü
163	Wochenschaltuhr Freitag 3: Schaltausgang	Ausgang	1.002	K L Ü
164	Wochenschaltuhr Freitag 4: Schaltausgang	Ausgang	1.002	K L Ü
165	Wochenschaltuhr Samstag 1: Schaltausgang	Ausgang	1.002	K L Ü
166	Wochenschaltuhr Samstag 2: Schaltausgang	Ausgang	1.002	K L Ü
167	Wochenschaltuhr Samstag 3: Schaltausgang	Ausgang	1.002	K L Ü
168	Wochenschaltuhr Samstag 4: Schaltausgang	Ausgang	1.002	K L Ü
169	Wochenschaltuhr Sonntag 1: Schaltausgang	Ausgang	1.002	K L Ü
170	Wochenschaltuhr Sonntag 2: Schaltausgang	Ausgang	1.002	K L Ü
171	Wochenschaltuhr Sonntag 3: Schaltausgang	Ausgang	1.002	K L Ü
172	Wochenschaltuhr Sonntag 4: Schaltausgang	Ausgang	1.002	K L Ü
173	UND Logik 1: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
174	UND Logik 1: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
175	UND Logik 1: 8 Bit Ausgang B	Ausgang	5.010	K L Ü

176	UND Logik 1: Sperrung	Eingang	1.002	K L S
177	UND Logik 2: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
178	UND Logik 2: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
179	UND Logik 2: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
180	UND Logik 2: Sperrung	Eingang	1.002	K L S
181	UND Logik 3: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
182	UND Logik 3: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
183	UND Logik 3: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
184	UND Logik 3: Sperrung	Eingang	1.002	K L S
185	UND Logik 4: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
186	UND Logik 4: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
187	UND Logik 4: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
188	UND Logik 4: Sperrung	Eingang	1.002	K L S
189	UND Logik 5: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
190	UND Logik 5: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
191	UND Logik 5: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
192	UND Logik 5: Sperrung	Eingang	1.002	K L S
193	UND Logik 6: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
194	UND Logik 6: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
195	UND Logik 6: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
196	UND Logik 6: Sperrung	Eingang	1.002	K L S
197	UND Logik 7: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
198	UND Logik 7: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
199	UND Logik 7: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
200	UND Logik 7: Sperrung	Eingang	1.002	K L S
201	UND Logik 8: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
202	UND Logik 8: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
203	UND Logik 8: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
204	UND Logik 8: Sperrung	Eingang	1.002	K L S
205	ODER Logik 1: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
206	ODER Logik 1: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
207	ODER Logik 1: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
208	ODER Logik 1: Sperrung	Eingang	1.002	K L S
209	ODER Logik 2: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
210	ODER Logik 2: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
211	ODER Logik 2: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
212	ODER Logik 2: Sperrung	Eingang	1.002	K L S
213	ODER Logik 3: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü

Nr.	Name	Funktion	DPT	Flags
214	ODER Logik 3: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
215	ODER Logik 3: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
216	ODER Logik 3: Sperrung	Eingang	1.002	K L S
217	ODER Logik 4: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
218	ODER Logik 4: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
219	ODER Logik 4: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
220	ODER Logik 4: Sperrung	Eingang	1.002	K L S
221	ODER Logik 5: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
222	ODER Logik 5: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
223	ODER Logik 5: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
224	ODER Logik 5: Sperrung	Eingang	1.002	K L S
225	ODER Logik 6: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
226	ODER Logik 6: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
227	ODER Logik 6: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
228	ODER Logik 6: Sperrung	Eingang	1.002	K L S
229	ODER Logik 7: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
230	ODER Logik 7: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
231	ODER Logik 7: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
232	ODER Logik 7: Sperrung	Eingang	1.002	K L S
233	ODER Logik 8: 1 Bit Schaltausgang	Ausgang	1.002	K L Ü
234	ODER Logik 8: 8 Bit Ausgang A	Ausgang	5.010	K L Ü
235	ODER Logik 8: 8 Bit Ausgang B	Ausgang	5.010	K L Ü
236	ODER Logik 8: Sperrung	Eingang	1.002	K L S
237	Logikeingang 1	Eingang	1.002	K L S
238	Logikeingang 2	Eingang	1.002	K L S
239	Logikeingang 3	Eingang	1.002	K L S
240	Logikeingang 4	Eingang	1.002	K L S
241	Logikeingang 5	Eingang	1.002	K L S
242	Logikeingang 6	Eingang	1.002	K L S
243	Logikeingang 7	Eingang	1.002	K L S
244	Logikeingang 8	Eingang	1.002	K L S
245	Logikeingang 9	Eingang	1.002	K L S
246	Logikeingang 10	Eingang	1.002	K L S
247	Logikeingang 11	Eingang	1.002	K L S
248	Logikeingang 12	Eingang	1.002	K L S
249	Logikeingang 13	Eingang	1.002	K L S
250	Logikeingang 14	Eingang	1.002	K L S
251	Logikeingang 15	Eingang	1.002	K L S
252	Logikeingang 16	Eingang	1.002	K L S
253	Softwareversion	auslesbar	217.001	K L Ü

3. Parameter setting

3.1 Behavior on poer failure and restoration of power

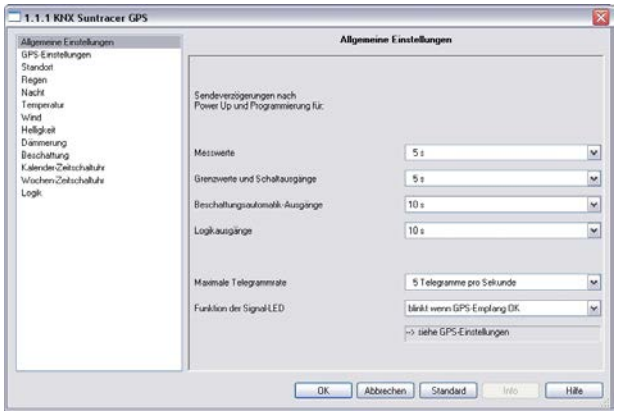
Behaviour on bus or auxiliary voltage failure:

The device transmits nothing.

Behaviour on bus or auxiliary voltage failur and following programming or reset:

The device sends all measurement values as well as switching and status according to their transmission behaviour set in the parameters with the delays established in the „General settings" parameter block. The „Software version" communications object is sent once after 5 seconds.

3.2 General settings



Transmission delay after power-up and programming for:	
Measurement values	5 secs … 2 hrs
Threshold values and switching outputs	5 secs … 2 hrs
Shade automation outputs	5 secs … 2 hrs
Logic outputs	5 secs … 2 hrs
Maximum message rate	1 • 2 • 3 • 5 • 10 • 20 messages per second
Function of the Signal LED	• None • On if signal object = 1 Off if signal object = • Blinks if signal object = 0 • Blinks if signal object = 1 • Blinks if GPS reception OK (➔ see GPS Settings) • Blinks if GPS reception not OK (➔ see GPS Settings)

3.3 GPS-Settings

Date and time will be set by	• GPS signal and not transmitted • GPS signal and transmitted periodically • GPS signal and transmitted on request • GPS signal and transmitted on request + periodically • Communications objects and not transmitted
Transmit cycle *(only if date and time are*	5 secs … 2 hrs

transmitted „periodically")	
If there's no reception, GPS malfunction is recognised ... after the last reception/reset	20 min • 30 min • 1 hr • 1,5 hrs • 2 hrs
After auxiliary voltage is re-stored it can take up to ten minutes till GPS OK.	
GPS malfunction transmits (1 = Malfunction | 0 = no Malfunction)	• not • on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Transmit cycle *(is transmitted if „periodically" is selected)*	5 secs ... 2 hrs

If date and time are set by GPS signal:

The current date and time can be set initially via the ETS. The weather station uses this data until the first time a valid GPS signal is received.

If date and time are set by communications object:

Between the transmission of the date and the transmission of the time, no date change may take place; they must be sent to the weather station on the same day.

On initial start-up the date and time must be sent directly after one another, so that the internal device clock can start.

The **B.E.G. KNX WTS-GPS** has an integrated real-time clock. Therefore, time keeps on running internally and can be sent to the bus, even when no GPS coverage is available or no time communication object has been received for some time. The internal clock of the weather station can show a time drift of up to ±6 seconds per day.

3.4 Location

The location data is required in order to be able to calculate the **position of the sun** with the help of the date and time. The exact location is received by GPS. During the initial start-up, the input coordinates are used for as long as no GPS reception exists.

In order to be able to display the **correct time**, the location must also be entered. Only in this way can the weather station automatically take into account the UTC offset (dif- ference from world time) and the summer/winter time change-over.

The coordinates of various towns are saved in the weather station:

Country	• Other countries • Belgium • Germany • France • Greece • Italy • Luxembourg • Netherlands	• Norway • Austria • Portugal • Sweden • Switzerland • Spain • Turkey • UK
Location	6 towns in Belgium 41 towns in Germany 30 towns in France 9 towns in Greece 20 towns in Italy 1 town in Luxembourg 8 towns in the Netherlands 11 towns in Norway 13 towns in Austria 5 towns in Portugal 15 towns in Sweden 12 towns in Switzerland 23 towns in Spain 13 towns in Turkey 21 towns in the UK	
Time zone definition	standard • specific	
Summer/winter time change-over on the Rule for summer/winter time change-over	[Change only possible with „Specific time zone definition"]	
Location coordinates	• do not transmit • transmit periodically • transmit on change • transmit on change and periodically	
On change of *(only if „on change" is selected)*	0,5° • 1° • 2° • 5° • 10°	
Transmit cycle *(only if „periodically" is selected)*	5 secs ... 2 hrs	

The summer/winter time change-over takes place automatically when „Time zone de- finition standard" is selected. If „Time zone definition specific" is selected, the rule for the change-over can be adjusted manually.

As soon as „another country" or „another location" is selected, the input fields for the exact coordinates appear.
(40° 43' northern latitude, 74° 0' western longitude) for New York, USA:

East. longitude [degrees, -180…+180]	0 [negative values mean „west. longitude"]
East. longitude [minutes, -59…+59]	0 [negative values mean „west. longitude"]
Northern latitude [Degrees, -90…+90]	0 [negative values mean „southern latitude"]
Northern latitude [minutes, -59…+59]	0 [negative values mean „southern latitude"]
Rule for summer/winter time change-over	0 [can be specified manually here]

3.5 Rain

Use rain sensor	No • **Yes**
When it rains the switching output is	1 • 0
Delays can be set via objects (in seconds)	No • Yes
Switching delay to rain	None • 1 sec ... • 2 hrs
Switching delay to non rain after drying	None • 1 sec ... • 2 hrs

Switching output transmits	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Transmit cycle *(is only transmitted if „periodically" is selected)*	5 secs ... 2 hrs
Use rain output 2 with fixed switching delays (this switching output has no delay on rain recognition and 5 minutes delay after it is dry again)	No • Yes

3.6 Night

Use night recognition Night is recognised below 10 Lux.	No • Yes
At night the switching output is	1 • 0
Delays can be set via objects (in seconds)	No • Yes
Switching delay to night	None • 1 sec ... 2 hrs
Switching delay to non-night	None • 1 sec ... 2 hrs
Switching output transmits	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Transmit cycle *(only if „periodically" is selected)*	5 secs ... 2 hrs

3.7 Temperature

Offset in 0.1°C	-50… 50
Measurement value	• do not transmit • transmit periodically • transmit on change • transmit on change and periodically
On change of *(only if „on change" is selected)*	2% • 5% • 10% • 25% • 50%
Transmit cycle *(only if „periodically" is selected)*	5 secs ... 2 hrs
Use minimum and maximum values (Values are not retained after reset)	No • Yes
Use object „temperature sensor malfunction"	No • Yes
Use threshold value 1 / 2 / 3 / 4	No • Yes

3.7.1 Temperatur 1/ 2 / 3 / 4

Threshold value:

.....

Threshold value setting via parameter:

Threshold value setting via	**Parameter** • Communications objects
Threshold value in 0.1°C	-300 ... 800
Hysteresis of the threshold value in %	0 ... 50

Threshold value setting via communications object:

Threshold value setting via	**Parameter** • Communications objects
The last communicated value should be retained	• no • after restoration of power • after restoration of power and

	programming
Start threshold value in 0.1°C valid till 1st communication	-300 ... 800
Type of threshold value change	Absolute value • Increase / Decrease
Step size (only for threshold value change through „Increase / Decrease")	0,1°C • 0,2°C • 0,3°C • 0,4°C • 0,5°C • 1°C •2°C • 3°C • 4°C • 5°C
Hysteresis of the threshold value in %	0 ... 50

If the threshold value is set by a communication object, during the initial commissioning a threshold value must be specified which is valid until the 1st communication of a new threshold value. With weather stations that have already been taken into service the last threshold value communicated is used.

If a threshold is set once via parameter or communication object, the last set threshold value remains until a new threshold value is transmitted by a communication object.

The last threshold values set by communications objects are saved in the EEPROM, so that they are retained during a power outage and are available once again when power is restored.

Switching output:

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Output is (TV = threshold value)	• TV above = 1 | TV - Hyst. below = 0 • TV above = 0 | TV - Hyst. below = 1 • TV below = 1 | TV + Hyst. above = 0 • TV below = 0 | TV + Hyst. above = 1
Delays can be set via objects (in seconds)	No • Yes
Switching delay from 0 to 1	None • 1 sec ... 2 hrs
Switching delay from 1 to 0	None • 1 sec ... 2 hrs
Switching output transmits	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Transmit cycle *(only if „periodically" is selected)*	5 secs ... 2 hrs

Block:

.....

Use switching output block	No • Yes
Evaluation of blocking object	• On Value 1: block | On Value 0: release • On Value 0: block | On Value 1: release
Blocking object value before 1st communication	0 • 1
Behaviour of the switching output	
On block	• do not transmit message • transmit 0 • transmit 1
On release (with 2 seconds release delay)	[Dependent on the setting „Switching output sends"]

The behaviour of the switching output on release is dependent on the value of the pa- rameter „Switching output transmits ..." (see „Switching output")

Switching output transmits on change	transmits no message • transmits status of the

	switching output
Switching output transmits on change to 1	transmits no message • if switching output = 1 ➔ transmit 1
Switching output transmits on change to 0	transmits no message • if switching output = 0 ➔ transmit 0
Switching output transmits upon change and periodically	transmit switching output status
Switching output transmits upon change to 1 and periodically	if switching output = 1 ➔ transmit 1
Switching output transmits upon change to 0 and periodically	if switching output = 0 ➔ transmit 0

3.8 Wind

Measurement value	• do not transmit • transmit periodically • transmit on change • transmit on change and periodically
On change of *(only if „on change" is selected)*	2% • 5% • 10% • 25% • 50%
Transmit cycle *(only if „periodically" is selected)*	5 secs … 2 hrs
Use min. and max. values (Values are not retained after reset)	No • Yes
Use object „wind sensor malfunction"	No • Yes
Use threshold value 1 / 2 / 3 / 4	No • Yes

3.8.1 Wind thershold value 1 / 2 / 3

Threshold value setting via	**Parameter** • Communications objects
Threshold value in 0.1 m/s	1 … 350
Hysteresis of the threshold value in %	0 … 50

Alle anderen Einstellungen entsprechen denen der Temperaturgrenzwerte (siehe *Temperaturgrenzwert 1 / 2 / 3 / 4*, Seite 5).

3.9 Brightness

If the shade automation is to be used, a threshold value must be active!

Measurement value	• do not transmit • transmit periodically • transmit on change • transmit on change and periodically
On change of *(only if „on change" is selected)*	2% • 5% • 10% • 25% • 50%
Send cycle *(only if „periodically" is selected)*	5 secs ... 2 hrs
Use threshold value 1 / 2 / 3 / 4	No • Yes

3.9.1 Brightness thershold value 1 / 2/ 3 / 4

Threshold value setting via	**Parameter** • Communications objects
Threshold value in kLux	0 … 150
Hysteresis of the threshold value in %	0 … 50

Alle anderen Einstellungen entsprechen denen der Temperaturgrenzwerte (siehe *Temperaturgrenzwert 1 / 2 / 3 / 4*, Seite 5).

3.10 Twilight

Use threshold value 1 / 2 / 3 / 4	No • Yes

3.10.1 Twilight thershold value 1 / 2 / 3

Threshold value setting via	**Parameter** • Communications objects
Threshold value in Lux	1 … 1000
Hysteresis of the threshold value in %	0 … 50

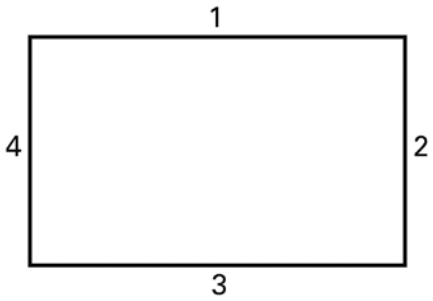
Alle anderen Einstellungen entsprechen denen der Temperaturgrenzwerte (siehe *Temperaturgrenzwert 1 / 2 / 3 / 4*, Seite 6).

3.11 Shading

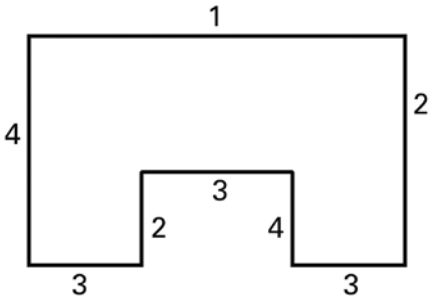
3.11.1 Classifying the facades for the control unit

The control options for shades (shadow edge tracking and slat tracking) are facade-related functions.

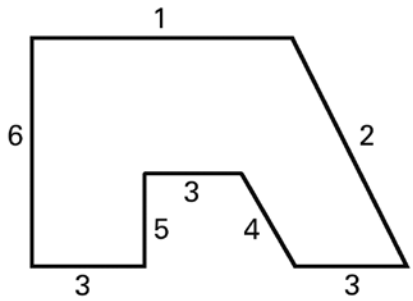
Most buildings have 4 facades. It is gene- rally recommended that the sunshade of each facade be controlled separately.



Even in buildings with a U-shaped layout, only 4 facades have to be controlled differently, as several have the same alignment.



In buildings with an asymmetrical layout the facades with a non-right-angled orientation (2, 4) must be controlled separately.

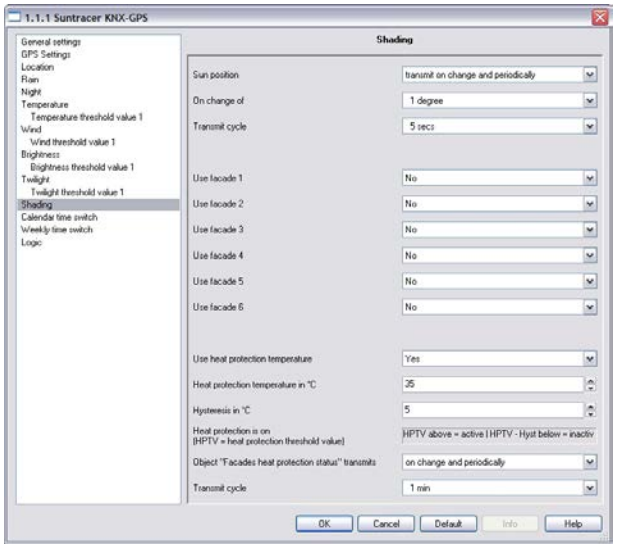


Curved / round fronts should be divided into several facades (segments) to be controlled individually.

If a building has more than 6 facades, the deployment of another weather station is recommended; particularly as this also makes it possible to measure the wind speed in another location.

When there are several buildings, wind measurement should take place separately for each building (e.g. with additional KNX W wind sensors), as, depending on the positions of the buildings in relation to one another, different wind speeds may occur.

3.12 Shade settings



Sun position	• do not transmit • transmit periodically • transmit on change • transmit on change and periodically
On change of *(only if „on change" is selected)*	1 °C ... 15 °C
Transmit cycle *(only if „periodically" is selected)*	5 secs ... 2 hrs
Use facade 1 / 2 / 3 / 4 / 5 / 6	No • Yes
Use heat protection temperature	No • Yes

If the heat protection temperature is used:

Use heat protection temperature	**Yes**
Heat protection temperature in °C	15 ... 50
Heat protection is (HPTV = Heat protection threshold value)	HPTV above = active HPTV - Hyst. below = inactive
Object „Facades heat protection status" transmits	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Transmit cycle *(only if „periodically" is selected)*	5 secs ... 2 hrs

3.13 Facade settings

For each facade, the shade conditions (brightness, position of the sun) and the facade settings (architectural characteristics such as orientation or slat type) can be specified.

Shade conditions:

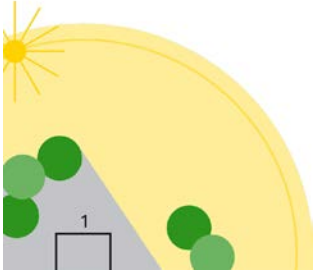
Brightness condition fulfilled, if	
Brightness above	Brightness threshold value 1 / 2 / 3 / 4
Brightness condition not fulfilled, if Brightness lower Threshold - hysteresis	
Hysteresis in % of threshold value	0 ... 50
Sun position condition fulfilled, if	
Sun	• from the East (Azimuth 0°…180°) • from the South-east (Azimuth 45°…225°) • from the East (Azimuth 90°…270°) • from the South-west (Azimuth 135°…315°) • from the East (Azimuth 180°…360°) • in the range

For numeric setting of the sun's range:

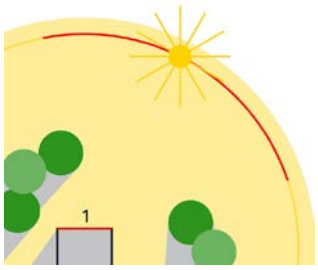
Sun	**in the range**
Azimuth [°] from	0 ... 360
Azimuth [°] to	0 ... 360
Elevation [°] from	0 ... 90
Elevation [°] to	0 ... 90

The angle, which is specified for the direction of the sun (azimuth), is aligned according to the orientation of the facade. In addition, obstacles which cast a shadow on the facade, such as, for example, a wall or overhanging roof, can also be taken into account in the setting for sun direction (azimuth) and sun height (elevation).

Example Azimuth setting

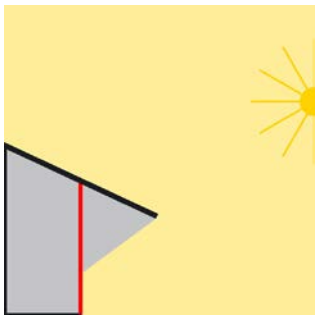


Top view:
In the morning the building is fully shaded by surrounding trees.



Top view:
For facade 1, shading must only be active in the azimuth marked red, as the sun can then shine on to the building without obstruction.

Example Elevation setting

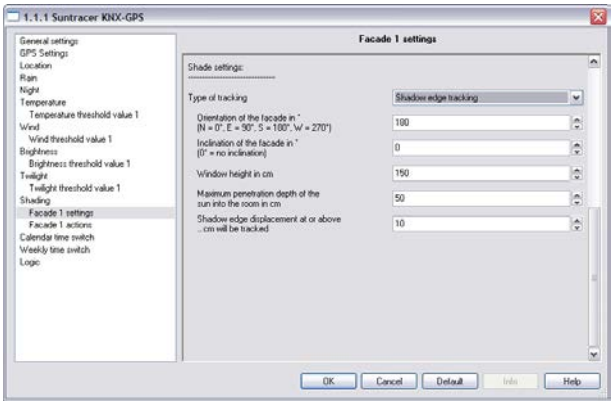


Side view:
When the sun's position is high, the facade is only shaded by the roof overhang. Shading is only necessary if the sun is low (in the figure approx. below 53°).

Shade settings

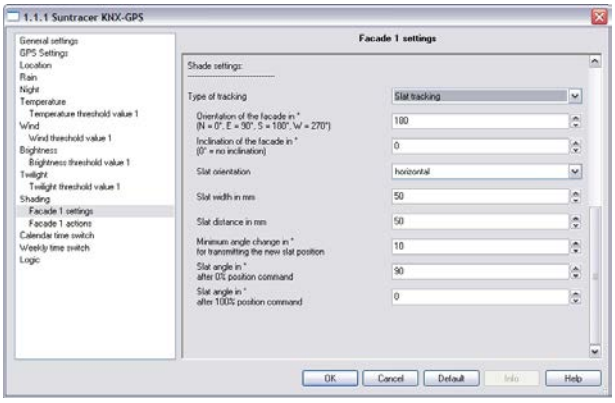
Type of tracking	• No tracking • Shadow edge tracking • Slat tracking • Shadow edge tracking and slat tracking	See chapter „Shadow edge and slat tracking"

3.13.1 Schattenkantennachführung



Type of tracking	**Shadow edge tracking**	
Orientation of the facade in ° [North 0°, East 90°, South 180°, West 270°]	0 … 360	See Chapter „Orientation and inclination of the facade"
Inclination of the facade in ° [0° = no inclination]	-90 … 90	
Window height in cm	1 … 1000	
Maximum penetration depth of the sun into the room in cm	10 … 250	

3.13.2 Slat tracking



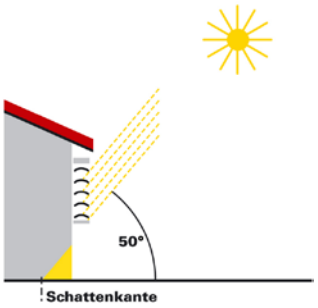
Type of tracking	**Slat tracking**	
Slat orientation	horizontal • vertical	See Chapter „Slat types and determination of width and distance"
Slat width in mm	1 … 1000	
Slat distance in cm	1 … 1000	
Minimum angle change in ° for transmitting the new slat position	1 … 90	
Slat angle in ° after 0% position command	0 … 180	See Chapter „slat position for horizontal/vertical slats"
Slat angle in ° after 100% position command	0 … 180	

3.13.3 Shadow edge tracking and slat tracking

With **shadow edge tracking** the sunshade is not moved down fully; rather it is moved only so far that the sun can still shine a parametrisable distance (e.g. 50 cm) into the room. This allows the room user to look at open air through the lower part of the window, and plants which may be on the window ledge to be exposed to the sun.

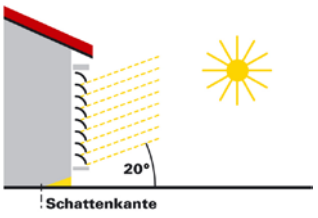
Note: The shadow edge tracking is only useable with a sunshade which is moved from the top downwards (e.g. shutters, textile shades or blinds with horizontal slats). This function is not useable with sunshades which are pulled in front of a window from one or both sides.

With **slat tracking** the horizontal slats of blinds are not fully closed but rather auto- matically adjusted so that the sun cannot shine directly into the room. Diffuse daylight can still enter the room through the slats and contribute to dazzle-free room lighting. Using slat tracking with external blinds, the entry of warm air into the room through sunshine can be avoided and, at the same time, energy costs for lighting the room can be reduced.



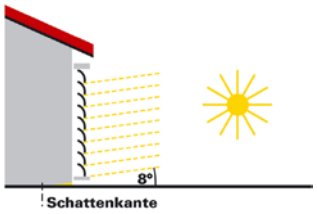
Sunshade when the position of the sun is high
The sunshade is only partially closed and automatically moved down only enough so that the sun cannot shine further into the room than specified via the maximum permitted penetration depth.

The slats can be set almost vertically without the sun shining directly into the room.



Sunshade when the sun is in a central position
The sunshade is automatically moved down only far enough so that the sun does not exceed the maximum permitted penetration depth in the room.

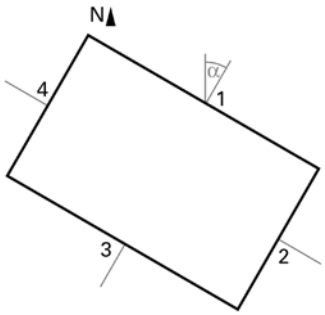
The slats are automatically closed further, so that the sun cannot shine directly into the room. Despite that, diffuse daylight can still reach the room and so contribute to the room lighting (daylight usage).



Sunshade when the position of the sun is low
The sunshade is automatically moved down almost fully, so that the sun does not shine too far into the room.

The slats are automatically closed further, so that the sun cannot shine in directly.

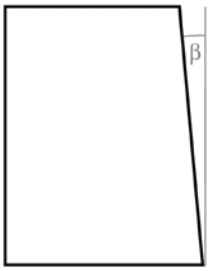
3.13.4 Orientation and inclination of the facade



Top view:
The facade orientation corresponds to the angle between the North-South axis and the facade verti- cal. The angle α here is measured in a clockwise direction (North corresponds to 0°, East 90°, South 180° and West 270°).

Facade 1: α
Facade 2: α + 90°
Facade 3: α + 180°
Facade 4: α + 270°

Example: The building in the picture is tilted by α = 30°, i. e. the facade orientation is
30°, 120°, 210° and 300°



Side view
If a facade surface is not oriented horizontally, this must be taken into account. A forward inclination of the facade is counted as a positive angle; a backwards inclination (as in the picture) as a negative angle. This also allows a sunshade of a window built into a sloping roof surface to be controlled according to the current position of the sun.

If a facade is not a flat surface, but rather arched or bent, it must be subdivided into several segments to be controlled separately.

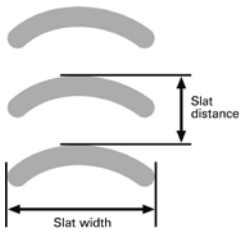
3.13.5 Slat types and determination of width and distance

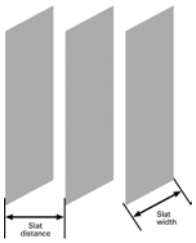
In the slat tracking, a distinction is made between a sunshade or glare protection with horizontal slats and one with vertical slats.

A sunshade with vertical slats (e.g. external blinds) is typically moved downwards from the top. By contrast, an internal glare protector often consists of thin strips of material (vertical slats), which can be rotated around 180° and are pulled out from one or both sides of the window.

Both types of slat can be adjusted by the weather station so that no direct sunlight falls into the room, but as much diffuse daylight as possible does.

In order for the slat tracking to set the slats correctly, their width and distance from one another must be known.





3.13.6 Slat position with horizontal slats

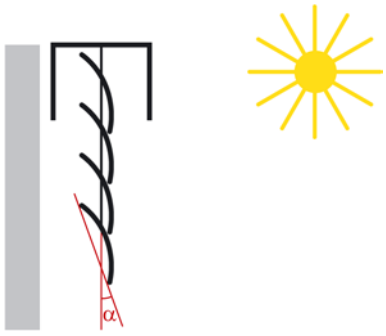
With Elsner actuators, which, for blinds drives with 2 stop positions, make it possible for movement to a sunshade position to be specified via a position input in per cent, the upper stop position (i.e. sunshade fully opened) is controlled or reported via the value „0%".

Sunshade opened (upper stop position: 0%)

If the lower stop position is to be approached, this is specified to the blinds actuator as sun position „100%" or it will report reaching the lower stop position (i.e. sunshade fully closed) using this value. If blinds are moved down from the upper stop position, the slats first turn into an almost vertical position and the sunshade moves with closed slats to the lower stop position.

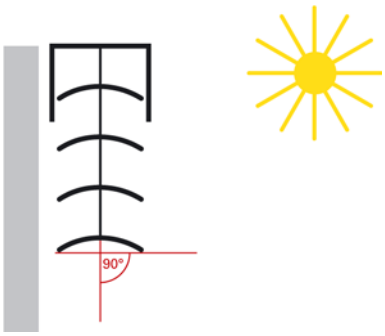
If the blinds are in the lower end position and the slats are fully closed, this slat position is described as both „vertical" and „100%". Normally, however, fully closed slats do not have an exactly vertical position (α = 0°) but rather form a slight angle with the vertical. With slat tracking, this angle must be determined and specified via the associated parameter.

sondern bilden einen kleinen Winkel mit der Senkrechten. Dieser Winkel muss bei der Lamellennachführung ermittelt und über den zugehörigen Parameter eingegeben werden.



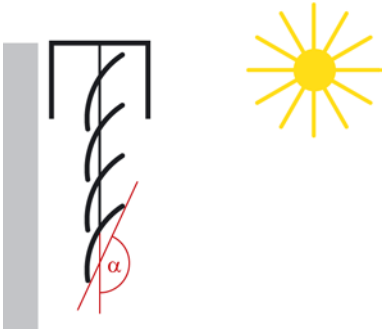
Sunshade and slats closed (lower stop position: 100%, slat position: 100%)

From its „vertical" position (completely closed, 100%) the slats can be adjusted to their horizontal position (fully opened, 0% or α = 90°). For this, the drive used for the blinds defines whether this adjustment can take place almost continuously in many small steps (as with SMI drives, for example) or whether it is only possible in a few large steps (as with most standard drives).



Slat position horizontal (0%, α = 90°)

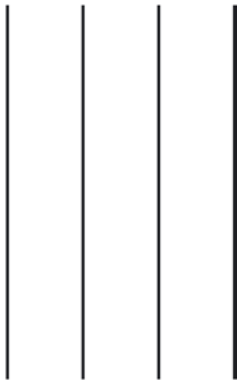
With standard blinds, the slats can be adjusted further via their horizontal position past the point where the slat adjustment ends and the blinds begin to move upwards. The slats then form an angle between 90° und 180° with the vertical.



Slat position at the beginning of movement UP

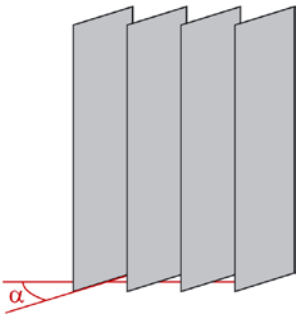
3.13.7 Slat position with vertical slats

If an internal glare protector or screen with vertical slats is controlled by an KNX-WTS blinds actuator, the position in which the slats are fully open is controlled or reported as the 0% slat position.



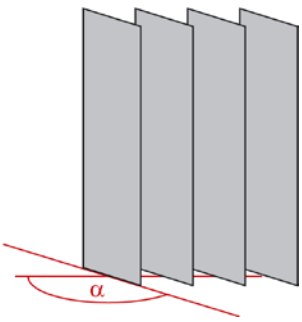
Fully opened vertical slats (slat position 0%)

If the slats are fully closed, this position is controlled or reported as the 100% slat position. This is the position in which the glare protector is moved in front of the window from the stop position at the side. For this, the angle formed by the slats with the direction of movement is >0°.



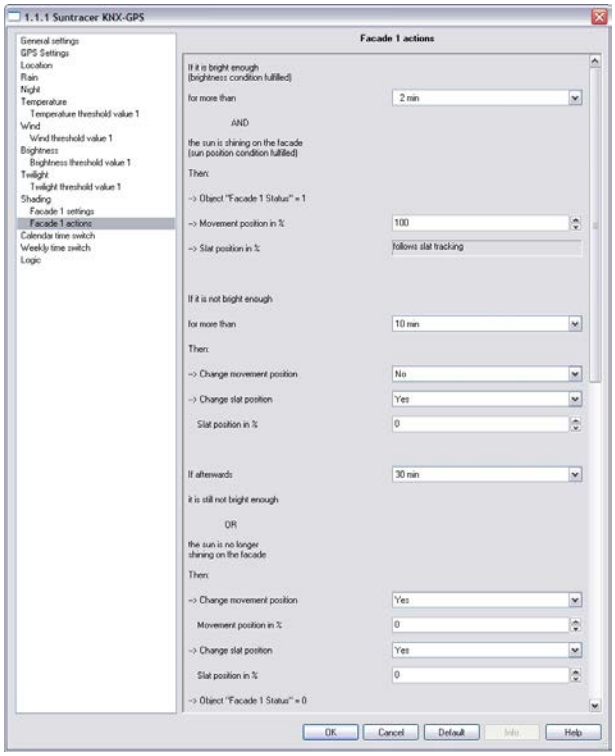
Fully closed vertical slats (slat position 100%)

If the glare protector is later retracted (i.e. opened), in the process the vertical slats are turned into a position that is somewhat less than 180°.



Vertical slats at the beginning of movement UP

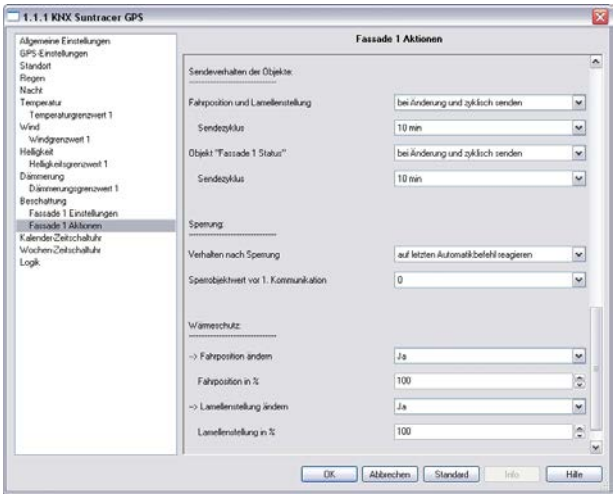
3.14 Facade actions



If it is bright enough (brightness condition fulfilled)	
for more than	0 secs ... 2 hrs
AND	
the sun is shining on the facade (sun position condition fulfilled)	
Then:	
➔ Object „Facade 1 status" = 1	
➔ Movement position in %	0 ... 100 (or „follow shadow edge tracking")
➔ Slat position in %	0 ... 100 (or „follows slat tracking")

If it is not bright enough	
for more than	0 secs ... 2 hrs
Then:	
➔ Change movement position	Yes • No
Movement position in % *(only if movement position should be changed)*	0 ... 100
➔ Change slat position	Yes • No
Slat position in % *(only if slat position should be changed)*	0 ... 100

If aterwards it is still not bright enough	0 s ... 2 h
OR	
the sun is no longer shining on the facade	
Then:	
➔ Objekt „Facade 1 status" = 0	
➔ Change movement position	Yes • No
Movement position in % (only if movement position should be changed)	0 ... 100
➔ Change slat position	Yes • No
Slat position % (only if slat positionshould be chnaged)	0 ... 100



GB fehlt

Transmission behaviour of objects:

Movement position and slat position	• transmit on change • transmit on change and periodically
Transmit cycle *(only if „periodically" is selected)*	5 secs ... 2 hrs
Object transmits „Facade 1 status"	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Transmit cycle *(only if „periodically" is selected)*	5 secs ... 2 hrs

Heat protection:

.....

Use heat protection	Yes • No
Movement position in % *(only if heat protection is used)*	0 ... 100
Slat position in % *(only if heat protection is used)*	0 ... 100

Block:

.....

Behaviour after block	• react to the last automatic command • wait for the next automatic command
Blocking object before 1st communication	0 • 1

3.15 Calendar time switch

Period 1 / 2 / 3	not active • active

3.15.1 Calendar clock Period 1/2/3

From:

Month	January … December
Day	1 … 29 / 1 … 30 / 1 … 31 (according to month)
Up to and including:	
Month	January … December
Day	1 … 29 / 1 … 30 / 1 … 31 (according to month)
Sequence 1	not active • active
Sequence 2	not active • active

3.15.2 Calendar clock period 1/2/3 Sequence 1/2

Activation time hours	0 … 23
Activation time minutes	0 … 59
Deactivation time hours	0 … 23
Deactivation time minutes	0 … 59
Switching output transmits	• never • on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Transmit cycle *(only if „periodically" is selected)*	5 s ... 2 h

3.16 Weekly time switch

Monday … Sunday	not active • active

All 4 sequences for the selected day will be activated together.

3.16.1 Weekly clock Mo, Tu, We, Th, Fr, Sa, Su 1 ... 4

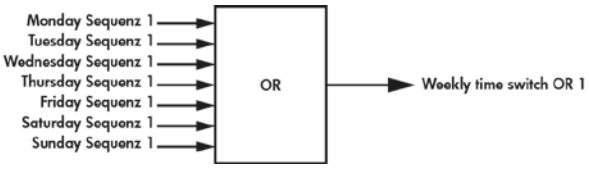
Activation time hours	0 ... 23
Activation time minutes	0 ... 59
Deactivation time hours	0 ... 23
Deactivation time minutes	0 ... 59
Shall sequence 1 / 2 / 3 / 4 be allocated to the linkage weekly clock OR 1 / 2 / 3 / 4?	nicht zugewiesen werden • zugewiesen werden
Switching output transmits	• nicht • bei Änderung • bei Änderung auf 1 • bei Änderung auf 0 • bei Änderung und zyklisch • bei Änderung auf 1 und zyklisch • bei Änderung auf 0 und zyklisch
Transmit cycle *(only if „periodically" is selected)*	5 s ... 2 h

Note: If, for example, 15:35 is set as the switch-off time, the output switches off on the change from 15:35 to 15:36.

3.16.2 Use of weekly clock

The communications object „Weekly time switch OR 1/2/3/4"

The Sequence 1 switch times of all weekdays is linked via the OR logic gate „Sequence 1" and can be used internally for your own logic connections as „Weekly time switch 1".



3.17 Logic

Use logic inputs	No • Yes
Object value before 1st communication for:	
Logic input 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15 / 16	0 • 1

AND Logic

AND Logic 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8	not activ • activ

OR Logic

OR Logic 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8	not activ • activ

3.17.1 AND Logic 1/ 2 / 3 / 4 / 5 / 6 / 7 / 8

1. / 2. / 3. / 4. Input	• do not use • all switching events the sensor makes available (see „Connection inputs of the AND logic")
Logic output transmits	• a 1-bit object • two 8-bit objects

If the logic output transmits a 1-bit object:

Logic output transmits	**a 1-bit object**
if logic = 1 ➔ object value	1 • 0
if logic = 0 ➔ object value	1 • 0
Transmit behaviour	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Transmit cycle *(only if „periodically" is selected)*	5 secs ... 2 hrs

If the logic output transmits two 8-bit objects:

Logic output transmits	**two 8-bit objects**
Object type	• Value [0…255] • Per cent [0…100%] • Angle [0…360°] • Scene call-up [0…127]

if logic = 1 ➔ object A value	respectively 0 … 255 for „Value" 0 ... 100 for per cent 0 … 360 for angle 0 ... 127 for scenes
if logic = 0 ➔ object A value	
if logic = 1 ➔ object A value	
if logic = 0 ➔ object B value	
Transmit behaviour	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Transmit cycle *(only if „periodically" is selected)*	5 secs … 2 hrs

Objekt A: Shade position height (0 = safe position, 255 = fully extended).

Objekt B: Shade position slat angle (255 = 100% closed, 200 = approx. 80% closed).

Block:

Evaluation of the blocking object	• On Value 1: block | On Value 0: release • On Value 0: block | On Value 1: release
Blocking object value before 1st communication	0 • 1
Behaviour of the switching output	
On block	• do not transmit message • transmit 0 • transmit 1
On release (with 2 seconds release delay)	[Dependent on the "Switching output transmits" setting]

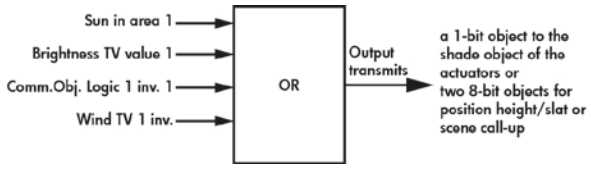
The behaviour of the switching output on release is dependent on the value of the parameter „Transmit behaviour ...” of the AND logic:

Transmit behaviour on change	transmit no message • transmit status of the switching output
Transmit behaviour on change to 1	transmit no message • if switching output = 1 ➔ transmit 1
Transmit behaviour on change to 0	transmit no message •
	if switching output = 0 ➔ transmit 0
Transmit behaviour on change and periodically	transmit switching output status
Transmit behaviour on change to 1 and periodically	if switching output = 1 ➔ transmit 1
Transmit behaviour on change to 0 and periodically	if switching output = 0 ➔ transmit 0

3.17.2 Use of the AND-Logic

Sun automation example:

To illustrate, the AND logic can be used to define the conditions for shading, for example a brightness threshold value and the sun in a specific area. The re-activation of the shading following a wind alarm and a manually-operated block are also included in this example.



- Sun in area 1: Describes the sun position for shading.
- Brightness threshold value 1: Defines the brightness from which shading will occur.
- Communications object Logic 1 inverted: Blocking function for the sun automation, e.g. via a button (blocking following manual operation). Logic = 0 ➔ released, Logic = 1➔ blocked. For this the „Communications objects logic inputs” must be released in „General Settings” and the „Communications object Logic 1” be linked with group addresses via the button.
- Wind threshold value 1 inverted: The automation activates again once a wind alarm is over (i.e. if the other conditions are fulfilled, shading will occur again).

3.17.3 Connection inputs of the AND logic

do not use (AND)
do not use (OR) Logic input 1
Logic input 1 inverted
Logic input 2
Logic input 2 inverted
Logic input 3
Logic input 3 inverted
Logic input 4
Logic input 4 inverted
Logic input 5
Logic input 5 inverted
Logic input 6
Logic input 6 inverted
Logic input 7
Logic input 7 inverted
Logic input 8
Logic input 8 inverted
Logic input 9
Logic input 9 inverted
Logic input 10
Logic input 10 inverted
Logic input 11
Logic input 11 inverted
Logic input 12
Logic input 12 inverted
Logic input 13
Logic input 13 inverted
Logic input 14
Logic input 14 inverted
Logic input 15
Logic input 15 inverted
Logic input 16
Logic input 16 inverted GPS Malfunction = ON GPS Malfunction = OFF
Temperature Sensor Malfunction = ON Temperature Sensor Malfunction = OFF Wind Sensor Malfunction = ON
Wind Sensor Malfunction = OFF Switching output rain 1
Switching output rain 1 inverted
Switching output rain 2

Switching output rain 2 inverted Switching output night Switching output night inverted
Switching output temp 1
Switching output temp 1 inverted
Switching output temp 2
Switching output temp 2 inverted
Switching output temp 3
Switching output temp 3 inverted
Switching output temp 4
Switching output temp 4 inverted
Switching output wind 1
Switching output wind 1 inverted
Switching output wind 2
Switching output wind 2 inverted
Switching output wind 3
Switching output wind 3 inverted
Switching output bright 1
Switching output bright 1 inverted
Switching output bright 2
Switching output bright 2 inverted
Switching output bright 3
Switching output bright 3 inverted
Switching output bright 4
Switching output bright 4 inverted
Switching output twil 1
Switching output twil 1 inverted
Switching output twil 2
Switching output twil 2 inverted
Switching output twil 3
Switching output twil 3 inverted
Facade 1 Status
Facade 1 Status inverted
Facade 2 Status
Facade 2 Status inverted
Facade 3 Status
Facade 3 Status inverted
Facade 4 Status
Facade 4 Status inverted
Facade 5 Status
Facade 5 Status inverted
Facade 6 Status
Facade 6 Status inverted
Switching output cal. clock Period 1 Seq. 1
Switching output cal. clock Per. 1 Seq. 1 inverted
Switching output cal. clock Period 1 Seq. 2
Switching output cal. clock Per. 1 Seq. 2 inverted
Switching output cal. clock Period Seq. 1
Switching output cal. clock Per. 2 Seq. 1 inverted
Switching output cal. clock Period Seq. 2
Switching output cal. clock Per. 2 Seq. 2 inverted
Switching output cal. clock Period Seq. 1
Switching output cal. clock Per. 3 Seq. 1 inverted
Switching output cal. clock Period Seq. 2
Switching output cal. clock Per. 3 Seq. 2 inverted
Switching output weekly clock Monday 1
Switching output weekly clock Monday 1 inverted
Switching output weekly clock Monday 2
Switching output weekly clock Monday 2 inverted
Switching output weekly clock Monday 3
Switching output weekly clock Monday 3 inverted
Switching output weekly clock Monday 4
Switching output weekly clock Monday 4 inverted
Switching output weekly clock Tuesday 1
Switching output weekly clock Tuesday 1 inverted
Switching output weekly clock Tuesday 2
Switching output weekly clock Tuesday 2 inverted
Switching output weekly clock Tuesday 3
Switching output weekly clock Tuesday 3 inverted
Switching output weekly clock Tuesday 4
Switching output weekly clock Tuesday 4 inverted
Switching output weekly clock Wednesday 1
Switching output weekly clock Wednesday 1 inverted
Switching output weekly clock Wednesday 2
Switching output weekly clock Wednesday 2 inverted
Switching output weekly clock Wednesday 3
Switching output weekly clock Wednesday 3 inverted
Switching output weekly clock Wednesday 4
Switching output weekly clock Wednesday 4 inverted
Switching output weekly clock Thursday 1
Switching output weekly clock Thursday 1 inverted
Switching output weekly clock Thursday 2
Switching output weekly clock Thursday 2 inverted
Switching output weekly clock Thursday 3
Switching output weekly clock Thursday 3 inverted
Switching output weekly clock Thursday 4
Switching output weekly clock Thursday 4 inverted
Switching output weekly clock Friday 1
Switching output weekly clock Friday 1 inverted
Switching output weekly clock Friday 2
Switching output weekly clock Friday 2 inverted
Switching output weekly clock Friday 3
Switching output weekly clock Friday 3 inverted
Switching output weekly clock Friday 4
Switching output weekly clock Friday 4 inverted
Switching output weekly clock Saturday 1
Switching output weekly clock Saturday 1 inverted
Switching output weekly clock Saturday 2
Switching output weekly clock Saturday 2 inverted
Switching output weekly clock Saturday 3
Switching output weekly clock Saturday 3 inverted
Switching output weekly clock Saturday 4
Switching output weekly clock Saturday 4 inverted
Switching output weekly clock Sunday 1
Switching output weekly clock Sunday 1 inverted
Switching output weekly clock Sunday 2
Switching output weekly clock Sunday 2 inverted
Switching output weekly clock Sunday 3
Switching output weekly clock Sunday 3 inverted
Switching output weekly clock Sunday 4
Switching output weekly clock Sunday 4 inverted
Weekly clock OR 1
Weekly clock OR 1 inverted
Weekly clock OR 2
Weekly clock OR 2 inverted
Weekly clock OR 3
Weekly clock OR 3 inverted

3.17.4 OR-Logic 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

1. / 2. / 3. / 4. Input	• do not use • all switching events the sensor makes available (see „Connection inputs of the OR logic")
Logic output transmits	• a 1-bit object • two 8-bit objects

All parameters of the OR logic correspond to those of the AND logic.

3.17.5 Connection inputs of the OR logic

The connection inputs of the OR logic correspond to those of the AND logic.
In addition the following inputs are available to the OR logic:

Switching output AND Logic 1
Switching output AND Logic 1 inverted
Switching output AND Logic 2
Switching output AND Logic 2 inverted
Switching output AND Logic 3
Switching output AND Logic 3 inverted
Switching output AND Logic 4
Switching output AND Logic 4 inverted
Switching output AND Logic 5
Switching output AND Logic 5 inverted
Switching output AND Logic 6
Switching output AND Logic 6 inverted
Switching output AND Logic 7
Switching output AND Logic 7 inverted
Switching output AND Logic 8
Switching output AND Logic 8 inverted