KNX EN

Suntracer KNX-GPS

Weather Station

elsner elektronik

Installation and Adjustment

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1. Description

The **Weather Station Suntracer KNX-GPS** measures temperature, wind speed and brightness. It recognises precipitation and receives the GPS signal for time and location. In addition, using location coordinates and the time, it calculates the exact position of the sun (azimuth and elevation).

All values can be used for the control of threshold value-dependent switching outputs. States can be linked via AND logic gates and OR logic gates. The compact housing of the **Suntracer KNX-GPS** accommodates the sensors, evaluation circuits and bus-coupling electronics.

Functions:

- **Brightness and position of the sun**: The current light intensity is measured by a sensor. In addition the Suntracer KNX-GPS calculates the position of the sun (azimuth and elevation) using time and location
- **Shade control** for up to 6 facades with slat and shadow edge tracking
- **Wind measurement**: The wind strength measurement takes place electronically and thus noiselessly and reliably, even during hail, snow and sub-zero temperatures. Even turbulent air and anabatic winds in the vicinity of the weather station are recorded
- **Precipitation recognition**: The sensor surface is heated, so that only drops and flakes are recognised as precipitation, but not mist or dew. When the rain or snow stops, the sensor is soon dry again and the precipitation warning ends
- **Temperature measurement**
- **Weekly and calendar time switch**: The weather station receives the time and date from the integrated GPS receiver. The weekly time switch switches up to 4 different periods per day. With the calendar time switch up to 3 additional time periods can be defined, in which up to 2 On/Off switches take place. The switching outputs can be used as communications objects. The switch times are set via parameters.
- **Switching outputs** for all measured and calculated values (threshold values can be set via parameters or communications objects)
- **8 AND and 8 OR logic gates** with 4 for each input. All switching events as well as 16 logic inputs (in the form of communications objects) can be used as inputs for the logic gates. The output of each gate can be optionally configured as 1-bit or 2 x 8-bit

Configuration is made using the KNX software ETS. The **programme file** (format VD), the data sheet and the manual can be downloaded from the Elsner Elektronik homepage on **www.elsner-elektronik.de** in the “Service” menu.

1.1. Technical data

Housing	Plastic
Colour	White / Translucent
Mounting	Surface-mounted
Protection rating	IP 44

Dimensions	approx. 96 × 77 × 118 (W × H × D, mm)
Weight	approx. 170 g
Ambient temperature	Operation -30…+50°C, storage -30…+70°C
Auxiliary voltage	12…40 V DC, 12…28 V AC. An appropriate 20 V AC power supply unit can be obtained from Elsner Elektronik.
Auxiliary current	max. 185 mA at 12 V DC, max. 81 mA at 24 V DC, Residual ripple 10%
Bus current	max. 8 mA
Data output	KNX +/- Bus connector terminal
BCU Type	own microcontroller
PEI Type	0
Group addresses	max. 254
Assignments	max. 255
Communication objects	254
Heater rain sensor	approx. 1,2 W
Measurement range temperature	-30…+80°C
Resolution (temperature)	0,1°C
Accuracy (temperature)	±1°C at -10…+85°C, ±1,5°C at -25…+150°C
Measurement range wind	0…35 m/s
Resolution (wind)	0,1 m/s
Accuracy (wind)	at ambient temperature -20…+50°C: ±22% of the measurement value when incident flow is from 45…315° ±15% of the measurement value when incident flow is from 90…270° (Frontal incident flow corresponds to 180°)
Measurement range brightness	0…150.000 Lux
Resolution (brightness)	1 Lux at 0…120 Lux 2 Lux at 121…1.046 Lux 63 Lux at 1.047…52.363 Lux 423 Lux at 52.364…150.000 Lux
Accuracy (brightness)	±20% at 0 lx … 10 klx ±15% at 10 klx … 150 klx

The following standards have been considered for the evaluation of the product in terms of electro magnetic compatibility:
Transient emissions:

- EN 60730-1:2000 Section EMV (23, 26, H23, H26) (threshold category: B)
- EN 50090-2-2:1996-11 + A1:2002-01 (threshold category: B)
- EN 61000-6-3:2001 (threshold category: B)

Interference resistance:
- EN 60730-1:2000 Section EMV (23, 26, H23, H26)
- EN 50090-2-2:1996-11 + A1:2002-01
- EN 61000-6-1:2004

The product has been tested for the above mentioned standards by an accredited EMV laboratory.

2. Installation and commissioning

2.1. Notes on installation

Installation, inspection, commissioning and troubleshooting of the device must only be carried out by a competent electrician.

Disconnect all lines to be assembled, and take safety precautions against accidental switch-on.

The device is exclusively intended for appropriate use. With each inappropriate change or non-observance of the instructions for use, any warranty or guarantee claim will be void.

After unpacking the device, check immediately for any mechanical damages. In case of transport damage, this must immediately notified to the supplier.

If damaged, the device must not be put into operation.

If an operation without risk may supposedly not be guaranteed, the device must be put out of operation and be secured against accidental operation.

The device must only be operated as stationary system, i.e. only in a fitted state and after completion of all installation and start-up works, and only in the environment intended for this purpose.

Elsner Elektronik does not assume any liability for changes in standards after publication of this instruction manual.

2.1.1. Installation position

Choose an installation position in the building where wind, rain and sun can be measured unhindered by the sensors. The weather station must not be installed underneath any structural parts from which water can still drip onto the rain sensor after it has stopped raining or snowing. The weather station must not be shaded by anything, such as building structures or trees. There must be at least 60 cm of free space underneath the weather station to allow it to measure the wind correctly and to prevent it from being snowed in when it snows. Please take note that an extended awning does not shade the device from sun and wind.

Temperature measurements can also be affected by external influences such as by warming or cooling of the building structure on which the sensor is mounted, (sunlight, heating or cold water pipes). Temperature variations from such sources of interference must be corrected in the ETS in order to ensure the specified accuracy of the sensor (temperature offset).

Magnetic fields, transmitters and interfering fields from electricity consumers (e.g. fluorescent lamps, neon signs, switched-mode power supplies etc.) can interfere with or even cut out reception of the GPS signal.

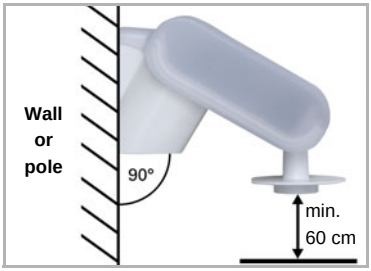


Fig. 1
The weather station must be mounted on a vertical wall (or a pole).

Fig. 2
The weather station must be mounted in the horizontal transverse direction (horizontally).

2.1.2. Mounting the weather station

2.1.3. Attaching the mount

The weather station comes with a combination wall/pole mount. The mount comes adhered by adhesive strips to the rear side of the housing.

Fasten the holder vertically to the wall or pole.

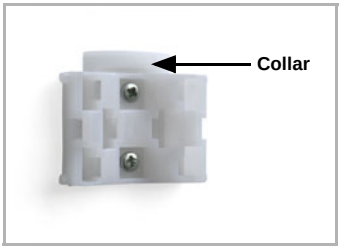


Fig. 3
For wall mounting: Flat side to the wall, crescent moon-shaped crosspiece facing up.

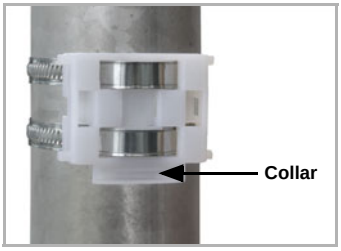


Fig. 4
For pole mounting: curved side to the pole, crosspiece facing down.

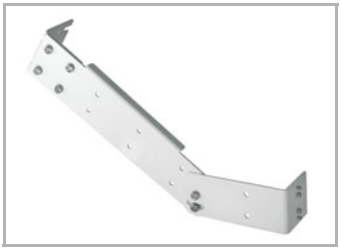


Fig. 5
A hinge arm mounting is available from Elsner Elektronik as an additional, optional accessory for flexible installation of the weather station on wall, pole or beam.

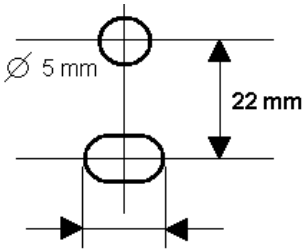
Fig. 6
Example use of the hinge arm mounting: With the hinge arm mounting, the weather station projects from beneath the roof overhang. Sun, wind and precipitation can act upon the sensors without hindrance.

Fig. 7
Example use of the hinge arm mounting:
Fitting to a pole with worm drive hose clips

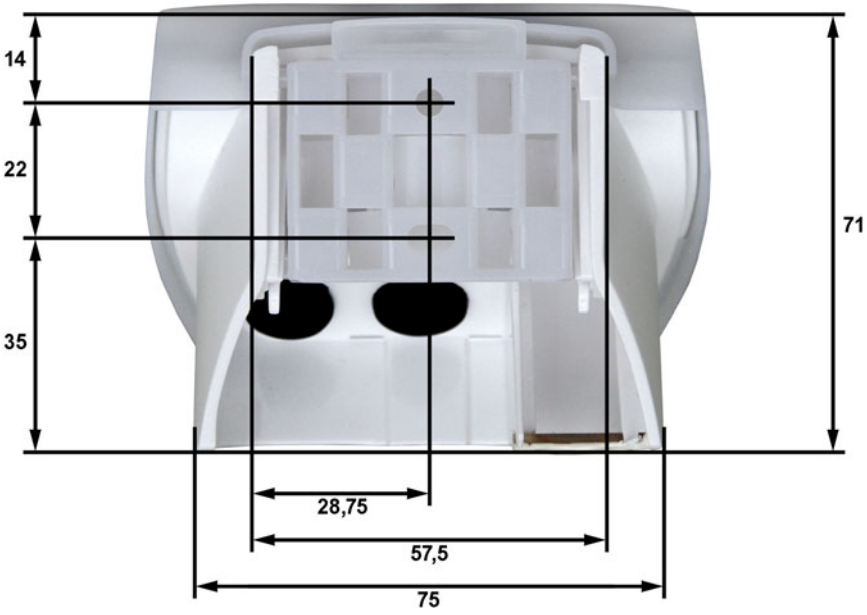
2.1.4. Rear view and drill sketch

Fig. 8 a+b
Drill sketch.

Dimensions of the rear side of the housing with holder, dimensions in mm. Divergences are possible for technical reasons.



Oblong hole 7,5 x 5 mm



2.1.5. Preparing the weather station

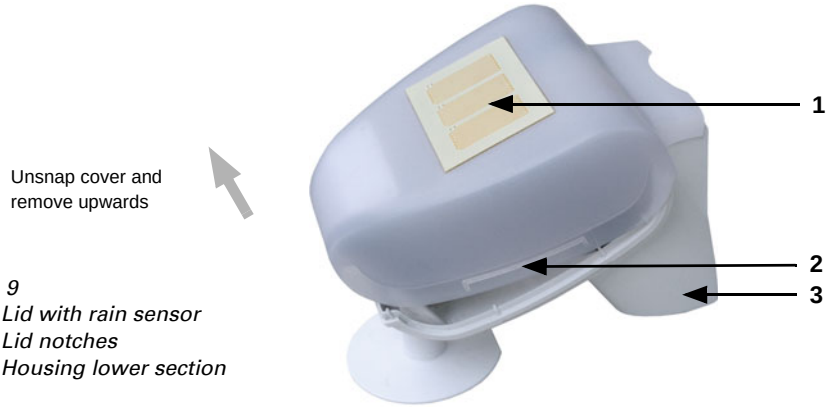
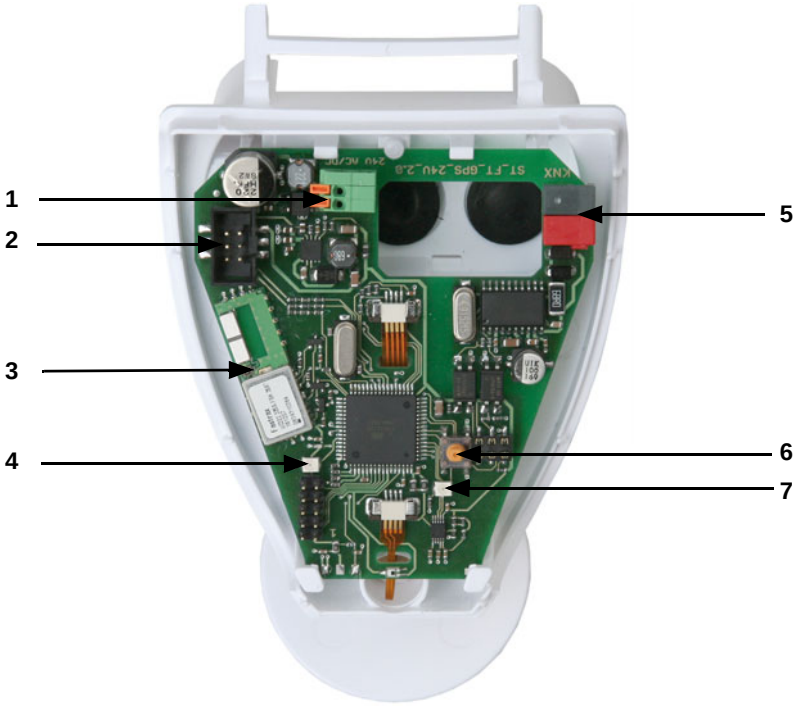


Fig. 9
1 Lid with rain sensor
2 Lid notches
3 Housing lower section

The weather station lid with the rain sensor latches into place on the lower edge to the right and left (see figure). Remove the lid from the weather station. Proceed carefully to avoid tearing off the cable connection between the circuit board in the lower section and the rain sensor in the lid (cable with plug).

Lead the cable for the voltage supply and bus connection through the rubber seals on the bottom of the weather station and connect Voltage L/N and Bus +/- to the terminals provided.

2.1.6. Layout of the circuit board



1 *Spring-force auxiliary voltage terminal, suitable for solid conductor up to 1.5 mm² or fine wire conductor*
2 *Slot for cable connection to the precipitation sensor in the casing lid*
3 *GPS antenna*
4 *Signal LED*
5 *KNX terminal +/-*
6 *Program button for setting up the device*
7 *Program LED*

2.1.7. Mounting the weather station

Close the housing by putting the cover back over the bottom part. The cover must snap in on the left and right with a definite “click”.

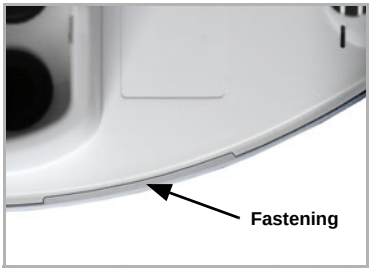


Fig. 10
Make sure the cover and bottom part are properly snapped together! This picture is looking at the closed sensor from underneath.

Fig. 11
Push the housing from above into the fastened mount. The bumps on the mount must snap into the rails in the housing.

To remove it, the weather station can be simply pulled upwards out of the mount, against the resistance of the fastening.

2.2. Notes on mounting and commissioning

Do not open weather station if water (rain) might ingress: even some drops might damage the electronic system.

Observe the correct connections. Incorrect connections may destroy the weather station or connected electronic devices.

Please take care not to damage the temperature sensor (small blank at the bottom part of the housing.) when mounting the weather station. Please also take care not to break away or bend the cable connection between the blank and the rain sensor when connecting the weather station.

Remove all existing protection labels after installation.

The measured wind value and thus all other wind switching outputs may only be supplied 60 seconds after the supply voltage has been connected.

After the auxiliary voltage has been applied, the device will enter an initialisation phase lasting 5 seconds. During this phase no information can be received via the bus.

3. Maintenance

The sensor must regularly be checked for dirt twice a year and cleaned if necessary. In case of severe dirt, the sensor may not work properly anymore.

As a precaution, the device should always be separated from power supply for maintenance works (e.g. deactivate or remove fuse).

4. Transmission protocol

Units:

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

4.1. 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

Nr.	Name	Function	DPT	Flags
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	Temperature 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	Temperature 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:	Input	1.002	C R W
	Switching output block			
32	Temperature TV 3: Absolute value	Input / Output	9.001	C R W T U
33	Temperature 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	Function	DPT	Flags
39	Temperature TV 4: Change (1:+ | 0: -)	Input	1.002	C R W
40	Temperature LV 4: Switching delay from 0 to 1	Input	7.005	C R W
41	Temperature LV 4: Switching delay from 1 to 0	Input	7.005	C R W
42	Temperature TV 4: Switching output	Output	1.002	C R T
43	Temperature TV 4:	Input	1.002	C R W
	Switching output block			
44	Wind measurement	Output	9.005	C R T
45	Wind measurement value requirement max.	Input	1.017	C R W
46	Maximum wind measurement value	Output	9.005	C R T
47	Wind measurement value reset max.	Input	1.017	C R W
48	Wind Sensor Malfunction (0 = OK | 1 = NOT OK)	Output	1.002	C R T
49	Wind TV 1: Absolute value	Input / Output	9.005	C R W T U
50	Wind TV 1: Change (1:+ | 0: -)	Input	1.002	C R W
51	Wind TV 1: Switching delay from 0 to 1	Input	7.005	C R W
52	Wind TV 1: Switching delay from 1 to 0	Input	7.005	C R W
53	Wind TV 1: Switching output	Output	1.002	C R T
54	Wind TV 1: Switching output block	Input	1.002	C R W
55	Wind TV 2: Absolute value	Input / Output	9.005	C R W T U
56	Wind TV 2: Change (1:+ | 0: -)	Input	1.002	C R W
57	Wind TV 2: Switching delay from 0 to 1	Input	7.005	C R W
58	Wind TV 2: Switching delay from 1 to 0	Input	7.005	C R W
59	Wind TV 2: Switching output	Output	1.002	C R T
60	Wind TV 2: Switching output block	Input	1.002	C R W
61	Wind TV 3: Absolute value	Input / Output	9.005	C R W T U
62	Wind TV 3: Change (1:+ | 0: -)	Input	1.002	C R W
63	Wind TV 3: Switching delay from 0 to 1	Input	7.005	C R W
64	Wind TV 3: Switching delay from 1 to 0	Input	7.005	C R W
65	Wind TV 3: Switching output	Output	1.002	C R T

Nr.	Name	Function	DPT	Flags
66	Wind TV 3: Switching output block	Input	1.002	C R W
67	Brightness measurement value	Output	9.004	C R T
68	Brightness TV 1: Absolute value	Input / Output	9.004	C R W T U
69	Brightness TV 1: Change (1:+ | 0: -)	Input	1.002	C R W
70	Brightness TV 1: Switching delay from 0 to 1	Input	7.005	C R W
71	Brightness TV 1: Switching delay from 1 to 0	Input	7.005	C R W
72	Brightness TV 1: Switching output	Output	1.002	C R T
73	Brightness TV 1: Switching output block	Input	1.002	C R W
74	Brightness TV 2: Absolute value	Input / Output	9.004	C R W T U
75	Brightness TV 2: Change (1:+ | 0: -)	Input	1.002	C R W
76	Brightness TV 2: Switching delay from 0 to 1	Input	7.005	C R W
77	Brightness TV 2: Switching delay from 1 to 0	Input	7.005	C R W
78	Brightness TV 2: Switching output	Output	1.002	C R T
79	Brightness TV 2: Switching output block	Input	1.002	C R W
80	Brightness TV 3: Absolute value	Input / Output	9.004	C R W T U
81	Brightness TV 3: Change (1:+ | 0: -)	Input	1.002	C R W
82	Brightness TV 3: Switching delay from 0 to 1	Input	7.005	C R W
83	Brightness TV 3: Switching delay from 1 to 0	Input	7.005	C R W
84	Brightness TV 3: Switching output	Output	1.002	C R T
85	Brightness TV 3: Switching output block	Input	1.002	C R W
86	Brightness TV 4: Absolute value	Input / Output	9.004	C R W T U
87	Brightness TV 4: Change (1:+ | 0: -)	Input	1.002	C R W
88	Brightness TV 4: Switching delay from 0 to 1	Input	7.005	C R W
89	Brightness TV 4: Switching delay from 1 to 0	Input	7.005	C R W
90	Brightness TV 4: Switching output	Output	1.002	C R T
91	Brightness TV 4: Switching output block	Input	1.002	C R W
92	Twilight TV 1: Absolute value	Input / Output	9.004	C R W T U
93	Twilight TV 1: Change (1:+ | 0: -)	Input	1.002	C R W

Nr.	Name	Function	DPT	Flags
94	Twilight TV 1: Switching delay from 0 to 1	Input	7.005	C R W
95	Twilight TV 1: Switching delay from 1 to 0	Input	7.005	C R W
96	Twilight TV 1: Switching output	Output	1.002	C R T
97	Twilight TV 1: Switching output block	Input	1.002	C R W
98	Twilight TV 2: Absolute value	Input / Output	9.004	C R W T U
99	Twilight TV 2: Change (1:+ | 0: -)	Input	1.002	C R W
100	Twilight TV 2: Switching delay from 0 to 1	Input	7.005	C R W
101	Twilight TV 2: Switching delay from 1 to 0	Input	7.005	C R W
102	Twilight TV 2: Switching output	Output	1.002	C R T
103	Twilight TV 2: Switching output block	Input	1.002	C R W
104	Twilight TV 3: Absolute value	Input / Output	9.004	C R W T U
105	Twilight TV 3: Change (1:+ | 0: -)	Input	1.002	C R W
106	Twilight TV 3: Switching delay from 0 to 1	Input	7.005	C R W
107	Twilight TV 3: Switching delay from 1 to 0	Input	7.005	C R W
108	Twilight TV 3: Switching output	Output	1.002	C R T
109	Twilight TV 3: Switching output block	Input	1.002	C R W
110	Sun position Azimuth [°]	Output (DPT 14.007)	14.007	C R T
111	Sun position Elevation [°]	Output (DPT 14.007)	14.007	C R T
112	Sun position Azimuth [°]	Output (DPT 9.*)	9.*	C R T
113	Sun position Elevation [°]	Output (DPT 9.*)	9.*	C R T
114	Facade heat protection status	Output	1.002	C R T
115	Facade 1: Status	Output	1.002	C R T
116	Facade 1: Movement position [%]	Output	5.001	C R T
117	Facade 1: Slat position [%]	Output	5.001	C R T
118	Facade 1: Block (1 = blocked)	Input	1.002	C R W
119	Facade 2: Status	Output	1.002	C R T
120	Facade 2: Movement position [%]	Output	5.001	C R T
121	Facade 2: Slat position [%]	Output	5.001	C R T
122	Facade 2: Block (1 = blocked)	Input	1.002	C R W
123	Facade 3: Status	Output	1.002	C R T

Nr.	Name	Function	DPT	Flags
124	Facade 3: Movement position [%]	Output	5.001	C R T
125	Facade 3: Slat position [%]	Output	5.001	C R T
126	Facade 3: Block (1 = blocked)	Input	1.002	C R W
127	Facade 4: Status	Output	1.002	C R T
128	Facade 4: Movement position [%]	Output	5.001	C R T
129	Facade 4: Slat position [%]	Output	5.001	C R T
130	Facade 4: Block (1 = blocked)	Input	1.002	C R W
131	Facade 5: Status	Output	1.002	C R T
132	Facade 5: Movement position [%]	Output	5.001	C R T
133	Facade 5: Slat position [%]	Output	5.001	C R T
134	Facade 5: Block (1 = blocked)	Input	1.002	C R W
135	Facade 6: Status	Output	1.002	C R T
136	Facade 6: Movement position [%]	Output	5.001	C R T
137	Facade 6: Slat position [%]	Output	5.001	C R T
138	Facade 6: Block (1 = blocked)	Input	1.002	C R W
139	Calendar time switch Period 1, Seq. 1: Switching output	Output	1.002	C R T
140	Calendar time switch Period 1, Seq. 2: Switching output	Output	1.002	C R T
141	Calendar time switch Period 2, Seq. 1: Switching output	Output	1.002	C R T
142	Calendar time switch Period 2, Seq. 2: switching output	Output	1.002	C R T
143	Calendar time switch Period 3, Seq. 1: Switching output	Output	1.002	C R T
144	Calendar time switch Period 3, Seq. 2: Switching output	Output	1.002	C R T
145	Weekly time switch Monday 1: Switching output	Output	1.002	C R T
146	Weekly time switch Monday 2: Switching output	Output	1.002	C R T
147	Weekly time switch Monday 3: Switching output	Output	1.002	C R T
148	Weekly time switch Monday 4: Switching output	Output	1.002	C R T
149	Weekly time switch Tuesday 1: Switching output	Output	1.002	C R T
150	Weekly time switch Tuesday 2: Switching output	Output	1.002	C R T
151	Weekly time switch Tuesday 3: Switching output	Output	1.002	C R T

Nr.	Name	Function	DPT	Flags
152	Weekly time switch Tuesday 4: Switching output	Output	1.002	C R T
153	Weekly time switch Wednesday 1: Switching output	Output	1.002	C R T
154	Weekly time switch Wednesday 2: Switching output	Output	1.002	C R T
155	Weekly time switch Wednesday 3: Switching output	Output	1.002	C R T
156	Weekly time switch Wednesday 4: Switching output	Output	1.002	C R T
157	Weekly time switch Thursday 1: Switching output	Output	1.002	C R T
158	Weekly time switch Thursday 2: Switching output	Output	1.002	C R T
159	Weekly time switch Thursday 3: Switching output	Output	1.002	C R T
160	Weekly time switch Thursday 4: Switching output	Output	1.002	C R T
161	Weekly time switch Friday 1: Switching output	Output	1.002	C R T
162	Weekly time switch Friday 2: Switching output	Output	1.002	C R T
163	Weekly time switch Friday 3: Switching output	Output	1.002	C R T
164	Weekly time switch Friday 4: Switching output	Output	1.002	C R T
165	Weekly time switch Saturday 1: Switching output	Output	1.002	C R T
166	Weekly time switch Saturday 2: Switching output	Output	1.002	C R T
167	Weekly time switch Saturday 3: Switching output	Output	1.002	C R T
168	Weekly time switch Saturday 4: Switching output	Output	1.002	C R T
169	Weekly time switch Sunday 1: Switching output	Output	1.002	C R T
170	Weekly time switch Sunday 2: Switching output	Output	1.002	C R T
171	Weekly time switch Sunday 3: Switching output	Output	1.002	C R T
172	Weekly time switch Sunday 4: Switching output	Output	1.002	C R T
173	AND Logic 1: 1-bit switching output	Output	1.002	C R T

Nr.	Name	Function	DPT	Flags
174	AND Logic 1: 8-bit output A	Output	5.010	C R T
175	AND Logic 1: 8-bit output B	Output	5.010	C R T
176	AND Logic 1: Block	Input	1.002	C R W
177	AND Logic 2: 1-bit switching output	Output	1.002	C R T
178	AND Logic 2: 8-bit output A	Output	5.010	C R T
179	AND Logic 2: 8-bit output B	Output	5.010	C R T
180	AND Logic 2: Block	Input	1.002	C R W
181	AND Logic 3: 1-bit switching output	Output	1.002	C R T
182	AND Logic 3: 8-bit output A	Output	5.010	C R T
183	AND Logic 3: 8-bit output B	Output	5.010	C R T
184	AND Logic 3: Block	Input	1.002	C R W
185	AND Logic 4: 1-bit switching output	Output	1.002	C R T
186	AND Logic 4: 8-bit output A	Output	5.010	C R T
187	AND Logic 4: 8-bit output B	Output	5.010	C R T
188	AND Logic 4: Block	Input	1.002	C R W
189	AND Logic 5: 1-bit switching output	Output	1.002	C R T
190	AND Logic 5: 8-bit output A	Output	5.010	C R T
191	AND Logic 5: 8-bit output B	Output	5.010	C R T
192	AND Logic 5: Block	Input	1.002	C R W
193	AND Logic 6: 1-bit switching output	Output	1.002	C R T
194	AND Logic 6: 8-bit output A	Output	5.010	C R T
195	AND Logic 6: 8-bit output B	Output	5.010	C R T
196	AND Logic 6: Block	Input	1.002	C R W
197	AND Logic 7: 1-bit switching output	Output	1.002	C R T
198	AND Logic 7: 8-bit output A	Output	5.010	C R T
199	AND Logic 7: 8-bit output B	Output	5.010	C R T
200	AND Logic 7: Block	Input	1.002	C R W
201	AND Logic 8: 1-bit switching output	Output	1.002	C R T
202	AND Logic 8: 8-bit output A	Output	5.010	C R T
203	AND Logic 8: 8-bit output B	Output	5.010	C R T
204	AND Logic 8: Block	Input	1.002	C R W
205	OR Logic 1: 1-bit switching output	Output	1.002	C R T
206	OR Logic 1: 8-bit output A	Output	5.010	C R T
207	OR Logic 1: 8-bit output B	Output	5.010	C R T
208	OR Logic 1: Block	Input	1.002	C R W
209	OR Logic 2: 1-bit switching output	Output	1.002	C R T
210	OR Logic 2: 8-bit output A	Output	5.010	C R T
211	OR Logic 2: 8-bit output B	Output	5.010	C R T
212	OR Logic 2: Block	Input	1.002	C R W
213	OR Logic 3: 1-bit switching output	Output	1.002	C R T

Nr.	Name	Function	DPT	Flags
214	OR Logic 3: 8-bit output A	Output	5.010	C R T
215	OR Logic 3: 8-bit output B	Output	5.010	C R T
216	OR Logic 3: Block	Input	1.002	C R W
217	OR Logic 4: 1-bit switching output	Output	1.002	C R T
218	OR Logic 4: 8-bit output A	Output	5.010	C R T
219	OR Logic 4: 8-bit output B	Output	5.010	C R T
220	OR Logic 4: Block	Input	1.002	C R W
221	OR Logic 5: 1-bit switching output	Output	1.002	C R T
222	OR Logic 5: 8-bit output A	Output	5.010	C R T
223	OR Logic 5: 8-bit output B	Output	5.010	C R T
224	OR Logic 5: Block	Input	1.002	C R W
225	OR Logic 6: 1-bit switching output	Output	1.002	C R T
226	OR Logic 6: 8-bit output A	Output	5.010	C R T
227	OR Logic 6: 8-bit output B	Output	5.010	C R T
228	OR Logic 6: Block	Input	1.002	C R W
229	OR Logic 7: 1-bit switching output	Output	1.002	C R T
230	OR Logic 7: 8-bit output A	Output	5.010	C R T
231	OR Logic 7: 8-bit output B	Output	5.010	C R T
232	OR Logic 7: Block	Input	1.002	C R W
233	OR Logic 8: 1-bit switching output	Output	1.002	C R T
234	OR Logic 8: 8-bit output A	Output	5.010	C R T
235	OR Logic 8: 8-bit output B	Output	5.010	C R T
236	OR Logic 8: Block	Input	1.002	C R W
237	Logic input 1	Input	1.002	C R W
238	Logic input 2	Input	1.002	C R W
239	Logic input 3	Input	1.002	C R W
240	Logic input 4	Input	1.002	C R W
241	Logic input 5	Input	1.002	C R W
242	Logic input 6	Input	1.002	C R W
243	Logic input 7	Input	1.002	C R W
244	Logic input 8	Input	1.002	C R W
245	Logic input 9	Input	1.002	C R W
246	Logic input 10	Input	1.002	C R W
247	Logic input 11	Input	1.002	C R W
248	Logic input 12	Input	1.002	C R W
249	Logic input 13	Input	1.002	C R W
250	Logic input 14	Input	1.002	C R W
251	Logic input 15	Input	1.002	C R W

Nr.	Name	Function	DPT	Flags
252	Logic input 16	Input	1.002	C R W
253	Software version	readable	217.001	C R T

5. Parameter setting

5.1. Behaviour on power failure and restoration of power

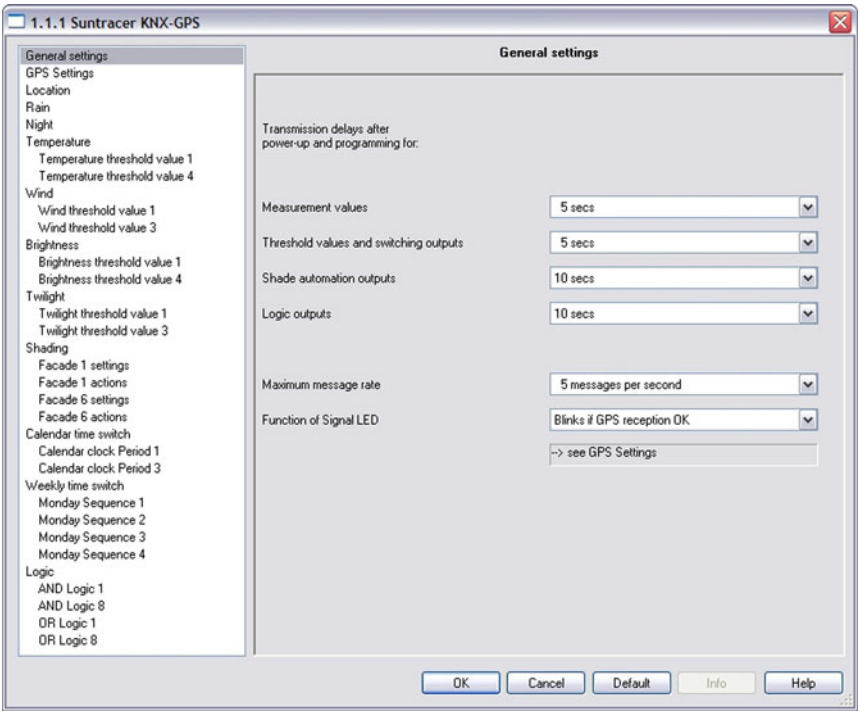
Behaviour on bus or auxiliary voltage failure:

The device transmits nothing.

Behaviour on bus or auxiliary voltage failure 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.

5.2. 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 = 0 • 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)

5.3. 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 transmitted „periodically")*	5 secs ... 2 hrs
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 restored 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 **Suntracer KNX-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.

5.4. 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 (difference 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 definition 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. For example, enter (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]

5.5. 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

5.6. 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

5.7. 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

5.7.1. Temperature threshold value 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:

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 parameter „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

5.8. 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

5.8.1. Wind threshold value 1 / 2 / 3

Threshold value:

Threshold value setting via parameter:

Threshold value setting via	**Parameter** • Communications objects
Threshold value in 0.1 m/s	1 ... 350
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 m/s valid till 1st communication	1 ... 350
Type of threshold value change	Absolute value • Increase / Decrease
Step size (only for threshold value change through „Increase / Decrease")	0.1 m/s • 0.2 m/s • 0.3 m/s • 0.4 m/s • 0.5 m/s • 1 m/s • 2 m/s • 3 m/s • 4 m/s • 5 m/s
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.

Once a threshold value is set 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:

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
Switching delay from 0 to 1	None • 1 sec ... 2 hrs
Switching delay from 1 to 0	None • 1 sec ... 2 hrs
Delays can be set via objects (in seconds)	No • Yes
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 „Switching output transmits" setting]

The behaviour of the switching output on release is dependent on the value of the parameter „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

5.9. 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

5.9.1. Brightness threshold value 1 / 2 / 3 / 4

Threshold value:

Threshold value setting via parameter:

Threshold value setting via	**Parameter** • Communications objects
Threshold value in kLux	0 ... 150
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 in kLux valid till 1st communication	0 ... 150
Type of threshold value change	Absolute value • Increase / Decrease
Step size (only for threshold value change through „Increase / Decrease")	1 klux • 2 klux • 3 klux • 4 klux • 5 klux • 10 klux
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.

Once a threshold value is set 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:

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
Switching delay from 0 to 1	None • 1 sec ... 2 hrs
Switching delay from 1 to 0	None • 1 sec ... 2 hrs
Delays can be set via objects (in seconds)	No • Yes

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 „Switching output transmits" setting]

The behaviour of the switching output on release is dependent on the value of the parameter „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

5.10. Twilight

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

5.10.1. Twilight threshold value 1 / 2 / 3

Threshold value:

Threshold value setting via parameter:

Threshold value setting via	**Parameter** • Communications objects
Threshold value in Lux	1 ... 1000
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 in Lux valid till 1st communication	0 ... 1000
Type of threshold value change	Absolute value • Increase / Decrease
Step size (only for threshold value change through „Increase / Decrease")	1 lux • 2 lux • 3 kux • 4 lux • 5 lux • 10 lux • 20 lux • 30 lux • 40 lux • 50 lux • 100 lux
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.

Once a threshold value is set 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:

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
Switching delay from 0 to 1	None • 1 sec ... 2 hrs

Switching delay from 1 to 0	None • 1 sec ... 2 hrs
Delays can be set via objects (in seconds)	No • Yes
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 „Switching output transmits" setting]

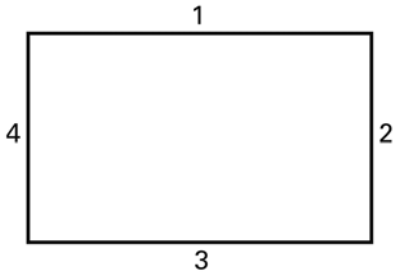
The behaviour of the switching output on release is dependent on the value of the parameter „Switching output transmits ..." (see „Switching output")

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

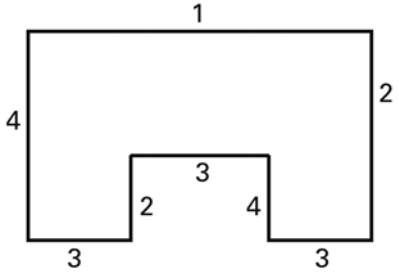
5.11. Shading

5.11.1.Classifying the facades for the control unit

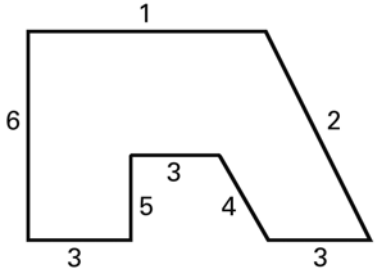
The control options for shades (shadow edge tracking and slat tracking) are facade-related functions.



Most buildings have 4 facades. It is generally 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.



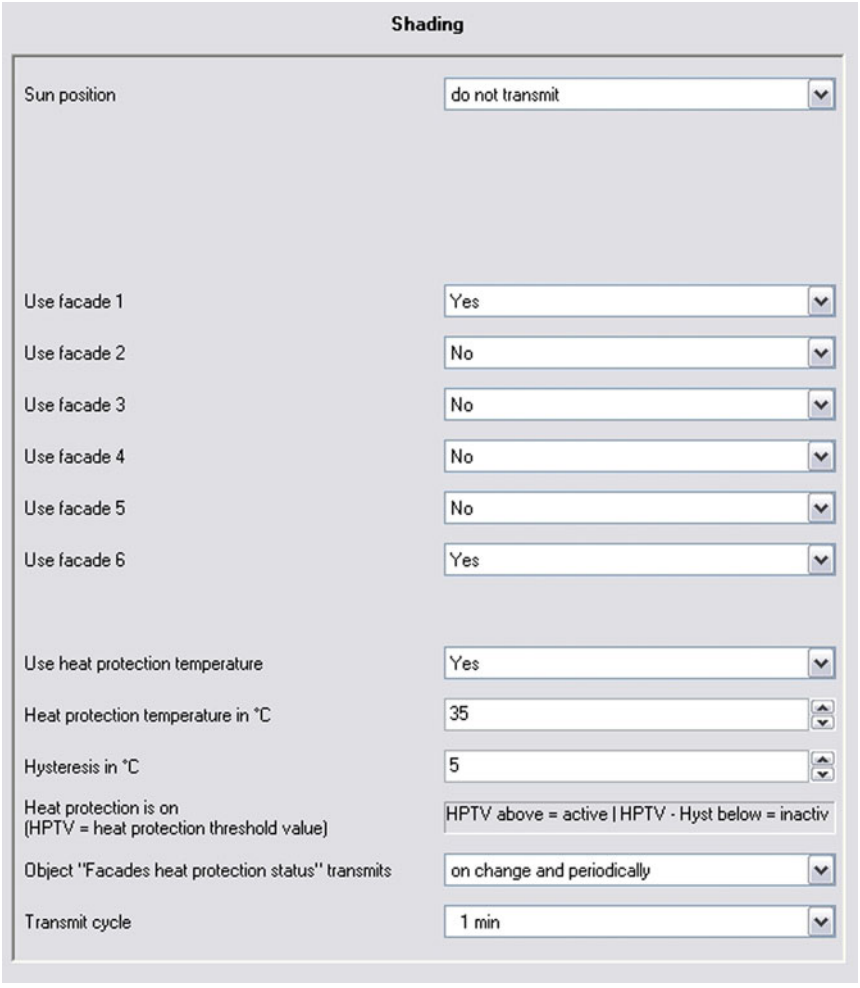
In buildings with an asymmetrical layout the facades with a non-right-angled orientation (2, 4) must be controlled separately.

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.

5.12. 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

5.13. 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.

Facade 1 settings

Shade conditions:

Brightness condition fulfilled, if

Brightness above	Brightness threshold value 1

Brightness condition not fulfilled, if

Brightness lower Threshold - hysteresis	
Hysteresis in % of threshold value	20

Sun position condition fulfilled, if

Sun	from the south (azimuth: 90°...270°)

Shade settings:

Type of tracking	Shadow edge tracking and slat tracking
Orientation of the facade in ° (N = 0°, E = 90°, S = 180°, W = 270°)	180
Inclination of the facade in ° (0° = no inclination)	0
Window height in cm	150
Maximum penetration depth of the sun into the room in cm	50
Shadow edge displacement at or above ... cm will be tracked	10
Slat width in mm	50
Slat distance in mm	50
Minimum angle change in ° for transmitting the new slat position	10
Slat angle in ° after 0% position command	90
Slat angle in ° after 100% position command	0

Shade conditions:

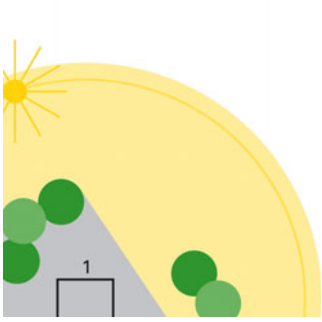
Brightness condition fulfilled, if	
Brightness above	Brightness threshold value 1 / 2 / 3 / 4
Brightness condition not fulfilled, if Brightness lower Threshold - hysteresis	
Hysteresis in % of threshold value	0 ... 50
Sun position condition fulfilled, if	
Sun	• from the East (Azimuth 0°...180°) • from 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

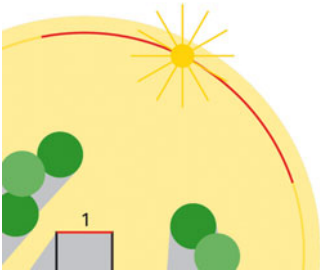
The angle, which is specified for the direction of the sun (azimuth), is aligned according to the orientation of the facade. In addition, obstacles which cast a shadow on the facade, such as, for example, a wall or overhanging roof, can also be taken into account in the setting for sun direction (azimuth)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

Example Azimuth setting:



Top view:

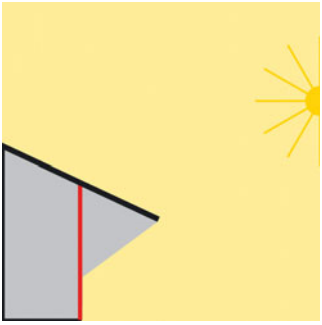
In the morning the building is fully shaded by surrounding trees.



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"

5.13.1.Shadow edge tracking

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	

Shadow edge displacement at or above ... cm will be tracked	1 ... 50	

5.13.2.Slat tracking

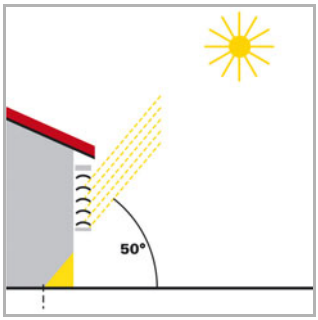
Type of tracking	**Slat tracking**	
Slat orientation	horizontal • vertical	See Chapter „Slat types and determination of width and distance"
Slat width in mm	1 ... 1000	
Slat distance in cm	1 ... 1000	
Minimum angle change in ° for transmitting the new slat position	1 ... 90	
Slat angle in ° after 0%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

5.13.3.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.

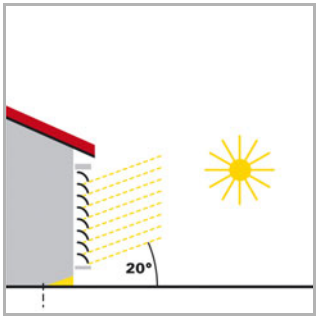
With **slat tracking** the horizontal slats of blinds are not fully closed but rather automatically adjusted so that the sun cannot shine directly into the room. Diffuse daylight can still enter the room through the slats and contribute to dazzle-free room lighting. Using slat tracking with external 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.

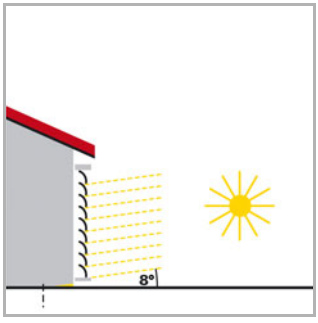
The slats can be set almost vertically without the sun shining directly into the room.



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).

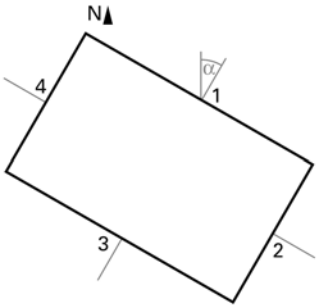


Sunshade when the position of the sun is low

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.

5.13.4.Orientation and inclination of the facade



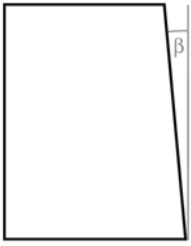
Top view:

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

The facade orientations result as follows:

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.

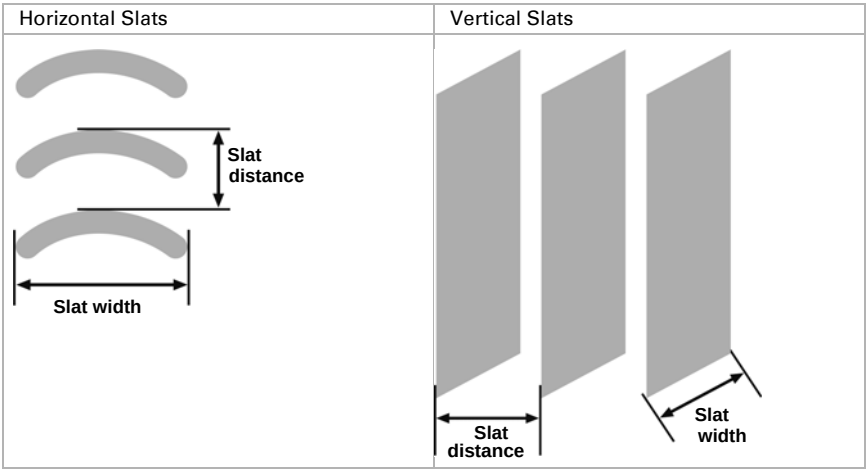
5.13.5.Slat types and determination of width and distance

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.

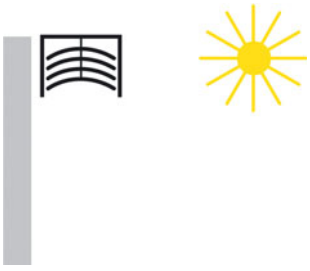
Both types of slat can be adjusted by the weather station so that no direct sunlight falls into the room, but as much diffuse daylight as possible does.

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



5.13.6.Slat position with horizontal slats

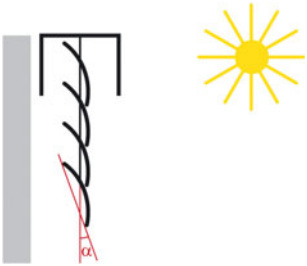
With Elsner actuators, which, for blinds drives with 2 stop positions, make it possible for movement to a sunshade position to be specified via a position input in per cent, the upper stop position (i. e. sunshade fully opened) is controlled or reported via the value „0%”.



Sunshade opened (upper stop position: 0%)

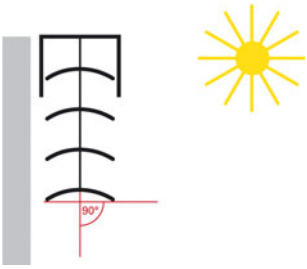
If the lower stop position is to be approached, this is specified to the blinds actuator as sun position „100%” or it will report reaching the lower stop position (i.e. sunshade fully closed) using this value. If blinds are moved down from the upper stop position, the slats first turn into an almost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



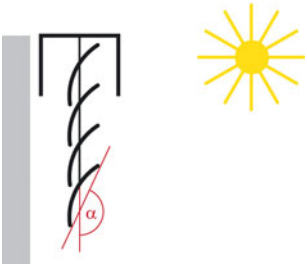
Sunshade and slats closed (lower stop position: 100%, slat position: 100%)

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°)

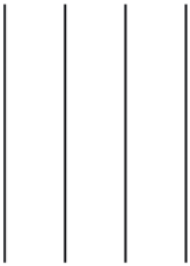
With standard blinds, the slats can be adjusted further via their horizontal position past the point where the slat adjustment ends and the blinds begin to move upwards. The slats then form an angle between 90° und 180° with the vertical.



Slat position at the beginning of movement UP

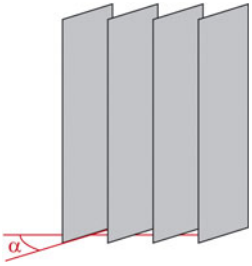
5.13.7.Slat position with vertical slats

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



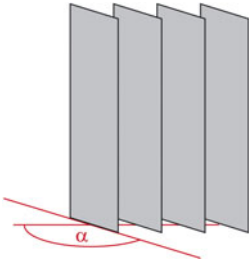
Fully opened vertical slats (slat position 0%)

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°.



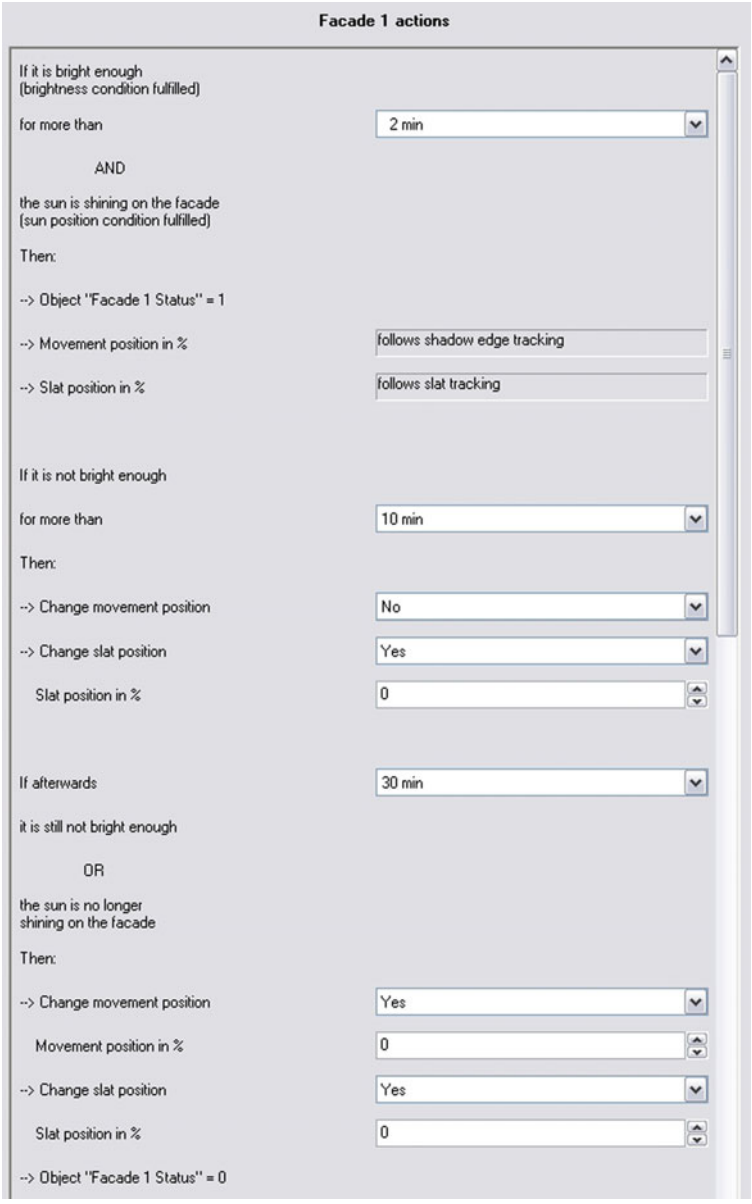
Fully closed vertical slats (slat position 100%)

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

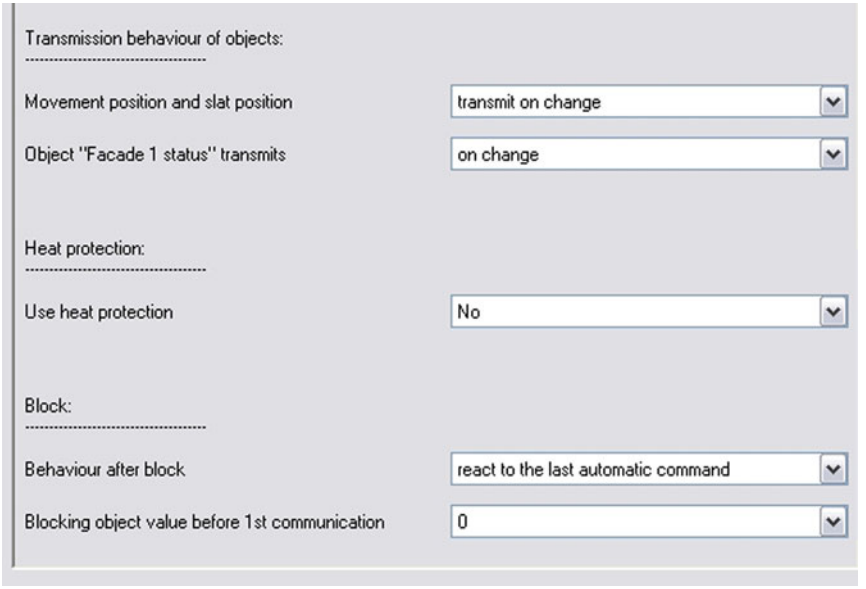
5.14. Facade actions



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 afterwards it is still not bright enough	0 secs ... 2 hrs
OR	
the sun is no longer shining on the facade	
Then: ➔ Object „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 in % *(only if slat position should be changed)*	0 ... 100



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

5.15. Calendar time switch

Period 1 / 2 / 3	not active • active

5.15.1.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

5.15.2.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
Schaltausgang sendet	• 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 secs ... 2 hrs

5.16. Weekly time switch

Monday ... Sunday	not active • active

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

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

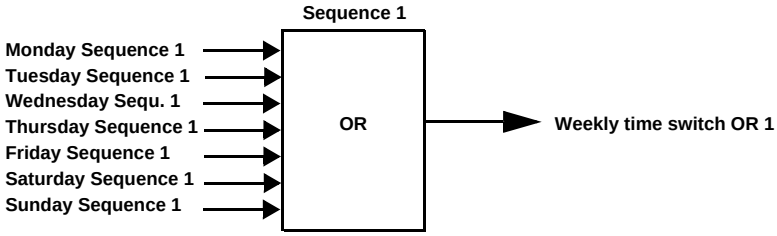
Activation time hours	0 ... 23
Activation time minutes	0 ... 59
Deactivation time hours	0 ... 23
Deactivation time minutes	0 ... 59
Shall sequence 1 / 2 / 3 / 4 be allocated to the linkage weekly clock OR 1 / 2 / 3 / 4?	No (do not allocate) • Yes (allocate)
Switching output transmits	• never • on change • 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 secs ... 2 hrs

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.

5.16.2. 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".



5.17. 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 active • active

OR Logic

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

5.17.1.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

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

Object 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]

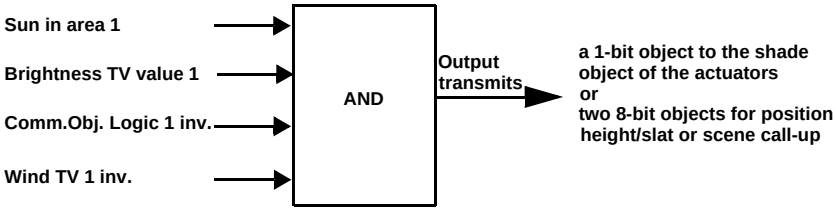
The behaviour of the switching output on release is dependent on the value of the parameter „Transmit behaviour ..." of the AND logic:

Transmit behaviour on change	transmit no message • transmit status of the switching output
Transmit behaviour on change to 1	transmit no message • wenn Schaltausgang = 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

5.17.2.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).

5.17.3.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

Weekly clock OR 4
Weekly clock OR 4 inverted

5.17.4.OR Logic

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.

5.17.5.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

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