

REALIZING SMART SHADING WITH KNX WEATHER STATIONS

From correct mounting to setting in the KNX application

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What do you think
when you see a façade like this?



Learning Goals

After this webinar, you will be able to:

- ✓ Selecting the right weather station for your project deployment
- ✓ Install the Suntracer KNX pro weather station correctly
- ✓ Implement automated shading with the Suntracer KNX pro



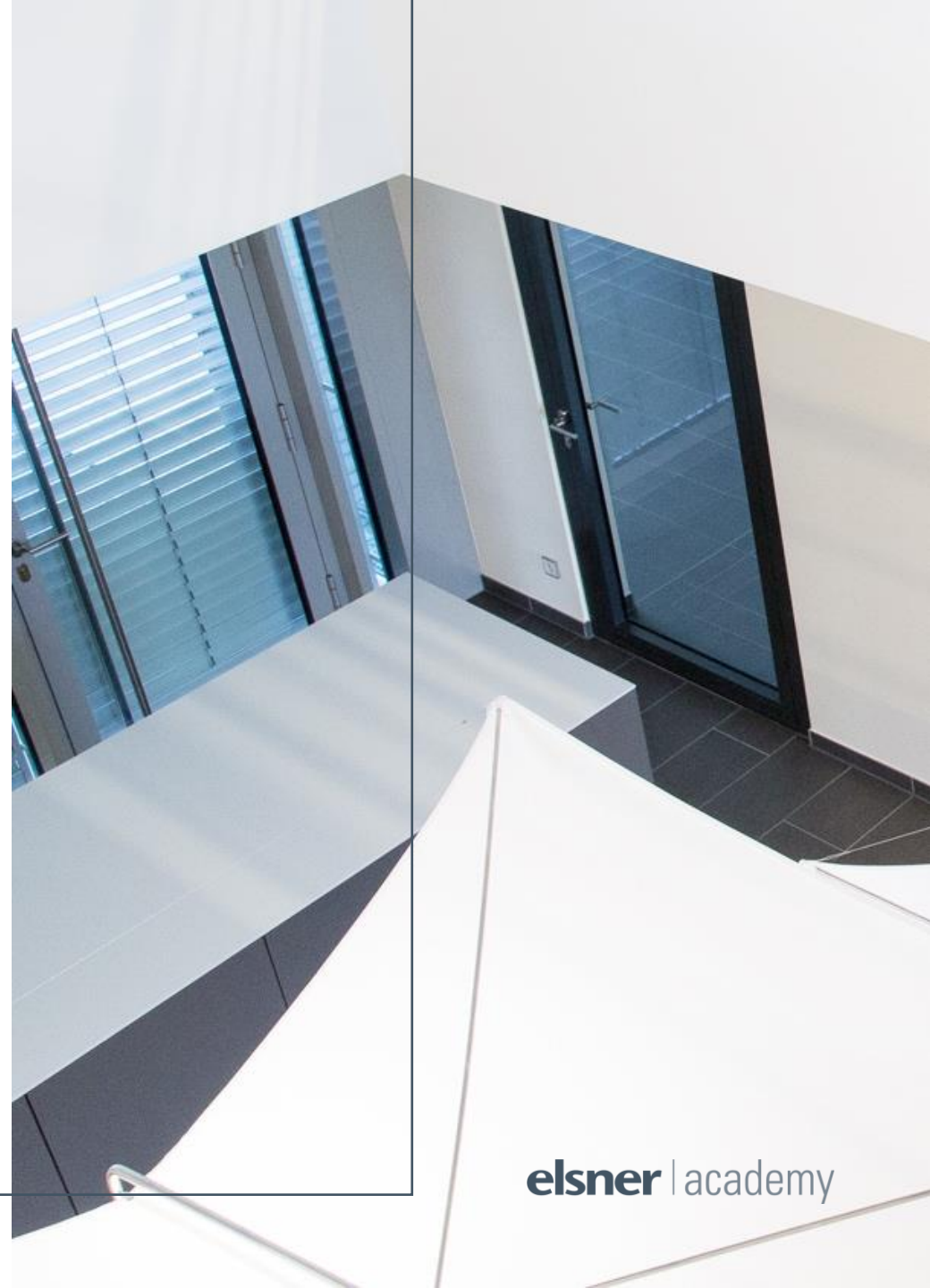
Agenda

1. Module

- a. Comparison and overview
- b. Mounting

2. Module

- a. Special features Suntracer KNX pro
- b. Set threshold value wind direction
- c. Set wind alarm threshold value
- d. Setting façade automation



An aerial photograph of a rural landscape. In the foreground, a two-lane asphalt road with white dashed center lines runs diagonally from the bottom center towards the middle right. The road is flanked by dense green forests. Beyond the road, there are rolling green hills and fields. In the distance, a small town or village is visible under a blue sky with scattered white clouds. A dark blue horizontal bar is overlaid on the middle of the image, containing the text '1 a | Comparison and Overview' in white.

1 a | Comparison and Overview

Product Overview KNX Weather Stations



Suntracer KNX pro

- High performance version
- Automation for 12 façade



Suntracer sl, sl light, basic

- Different versions



P04-KNX-GPS

- Plain version
- Without automatic shading or logics
- Only sends measured values to the bus



Winddancer KNX

- Mechanical wind sensor
- With or without GPS

Comparison of KNX Weather Stations

Name	Suntracer KNX pro	Suntracer KNX sl	Suntracer KNX-GPS	Suntracer KNX sl light	Suntracer KNX-GPS light	Windancer KNX-GPS	Suntracer sl basic	P04-KNX- GPS
Item number	70900	70154	3093	70155	3094/3090	71236	70156	71230
Air humidity	✓	–	–	–	–	–	–	–
Wind direction	✓	–	–	–	–	–	–	–
Air pressure	✓	✓	–	–	–	–	–	–
Automation	12 x façade	8 x façade	6 x façade	5 x façade	5 x façade	8 x shading	–	–
Tracking of slats & shadow edge	✓	✓	✓	–	–	✓	–	–
Time Switch	✓	✓	✓	✓	✓	✓	–	only time/date
Calculator modules	✓	✓	–	✓	–	–	–	–



1 b | Mounting of Weather Stations

Mounting of Type “sl”

Suntracer KNX sl, Suntracer KNX sl light,
Suntracer KNX sl basic, P04-KNX-GPS



Mounting of Suntracer KNX pro



Practical Exercise

Which weather station is correctly installed?



Solution to Exercise

Answer: Picture no. 3 shows the correct installation

3

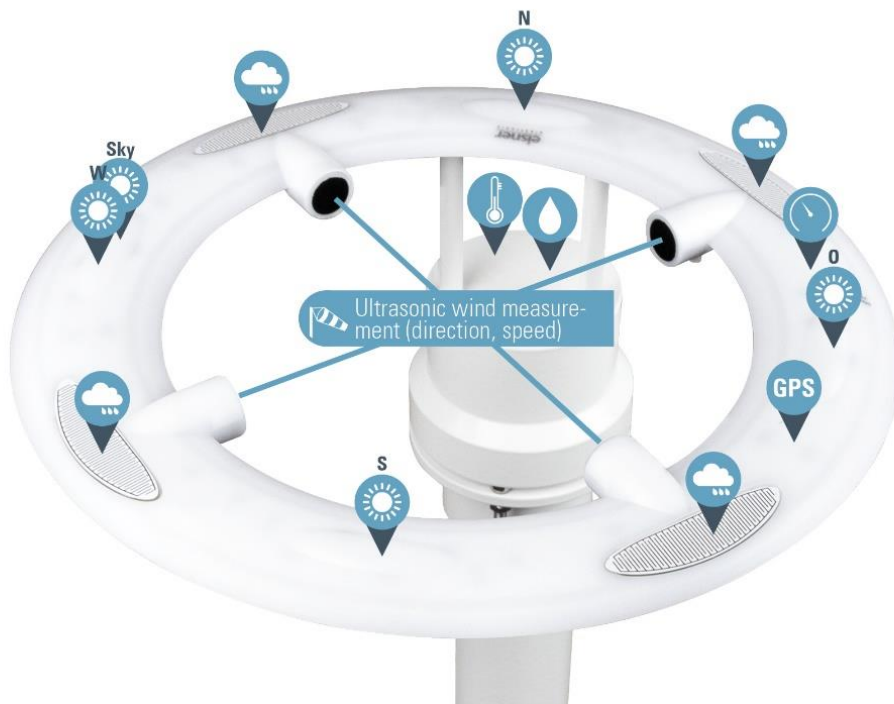


1st Module | Summary

2 a | Special Features Suntracer KNX pro

Features Suntracer KNX pro

Sensors



- Temperature 🌡️
- Wind speed and direction (ultrasonic measurement)
- Brightness (5 sensors in total) ☀️
- Precipitation ☁️
- Air humidity 💧
- Air pressure 📊
- GPS reception (location, time), 📶
- sun position calculation

Features Suntracer KNX pro

- Automatic function for 12 facades
- Display of the sensed temperature
- Wind measurement wear-free with ultrasound

- Output of wind direction in ° and text form
- Output of air pressure in hpa and text form

- KNX-Programming by magnetic switch

2 b and c | Setting Wind Threshold Values

Setting Wind Direction Threshold Values

- The setting of the wind direction threshold values is not integrated in the façade
- The wind direction must be integrated into the façade via an input object (safety)

Setting Wind Direction Threshold Values

Path in the ETS : Suntracer KNX pro > Wind direction ranges > Range X

Wind direction angle range:

Maintain the

ranges and delays received
via communication objects

not

Reported data indication for

Parameter Communication object

Angle range

from:

0

to:

180

Output is "one" if the value is within range.

Hysteresis:

5°

Output is "zero" if the value is outside the range, incl. hysteresis (from - hyst. to + hyst.).

Switching output:

Delay can be set via objects
(in seconds)

No Yes

Delay from 0 to 1

none

Delay from 1 to 0

none

Send switching outputs

on change and periodically

Cycle

5 sec

Block

Use switching procedure block

No Yes

Wind Threshold Value

Path in the ETS : Suntracer KNX pro > Wind threshold values > Threshold value X

Threshold value:

Maintain the
threshold values and delays received
via communication objects

Threshold value setpoint per Parameter Communication object

Threshold value in 0.1 m/s

Hysteresis setting in % absolute

Hysteresis in 0.1 m/s

Switching output:

Output is at
(TV = threshold value)

Delays can be set via objects
(in seconds) No Yes

Delay from 0 to 1

Delay from 1 to 0

Send switching outputs

Cycle

Block:

Use block of the switching output No Yes

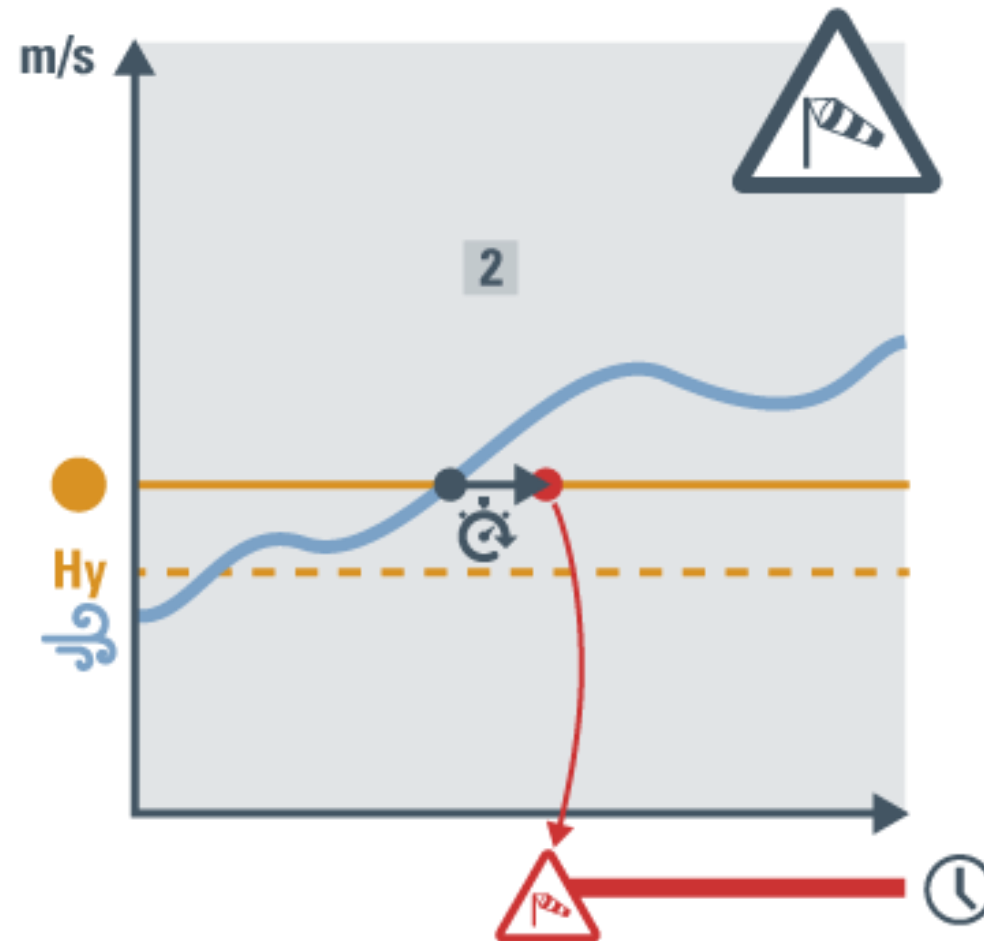
Evaluation of the blocking object if value 1: block | if value 0: release
 if value 0: block | if value 1: release

Value of the blocking object
before 1. communication 0 1

Action when locking

Action when releasing
(with 2 seconds release delay)

Wind Threshold Value



Wind Threshold Values in the Façade Control System

Setting in the façade and wind threshold value

Path in the ETS : Suntracer KNX pro > Facades > Facade X: Function, safety

Wind alarm

use

Note: If there has been no measurement change at the activated

wind sensors within 48 hours, wind alarm will be triggered.

use the following wind sensors

Internal sensor measurement

Measurements of communication object

Façade wind 1

No Yes

Façade wind 2

No Yes

as wind alarm per threshold value

No

as wind alarm per threshold value

as wind alarm per bit object

as wind alarm and wind ext. blocking per TLV

as wind alarm per TLV/ext. blocking per bit obj.

as wind alarm per bit obj./ext. blocking per TLV

as wind alarm/wind ext. blocking per bit obj.

Threshold value setpoint using

Parameter Object

Wind alarm threshold value
(in 0.1 m/s) retracts curtain.

80

Wind alarm delay (in s)

2

If the threshold value is not exceeded within 5 minutes, the alarm is deleted again.

Automation blocking duration after wind alarm

is adjustable in the "Façades" menu.

366	Wind threshold value 1: Switching output block	Input	1 bit	K	-	S	-	-	-
609	Façade Wind measurement 1 in m/s	Input	2 bytes	K	-	S	Ü	-	0

2 b and c | Summary: Settings Wind Threshold Values & Wind Alarm

2 d | Façade Automation

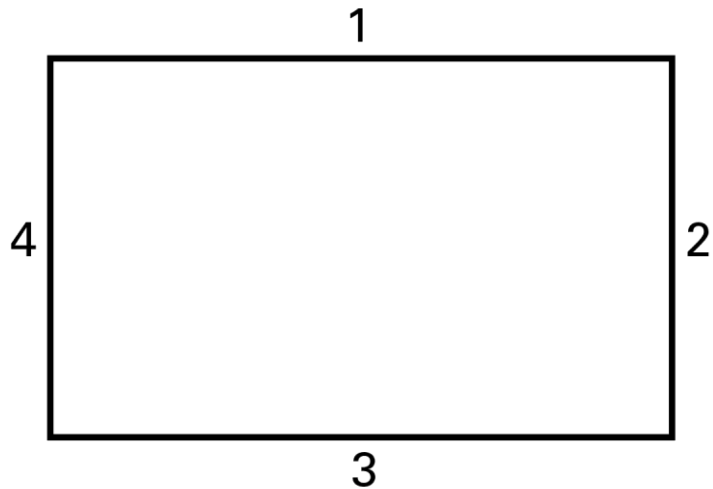
Functions of the Façade Control

- Timers (time opening/time closing)
- Night closing
- Heat protection
- Pyranometer
- Rain automatic
- Indoor temperature block
- **Automatic sun protection**
- Outdoor temperature block

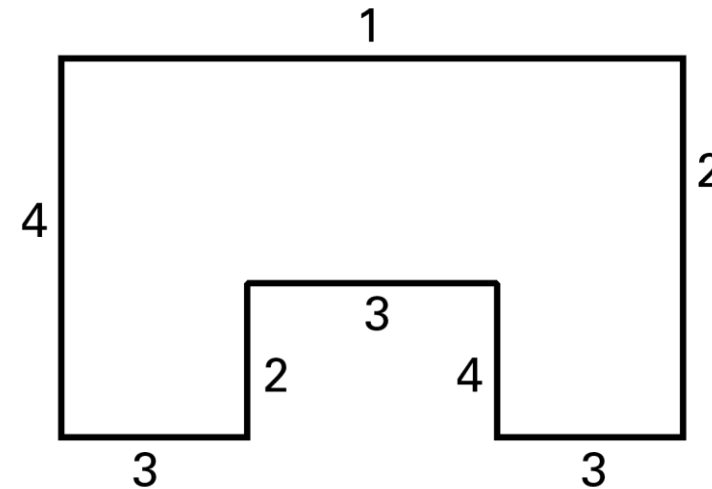
Separate section with protective functions for the façade

- Windspeed
- Frost
- Rain

Classification of the Façades

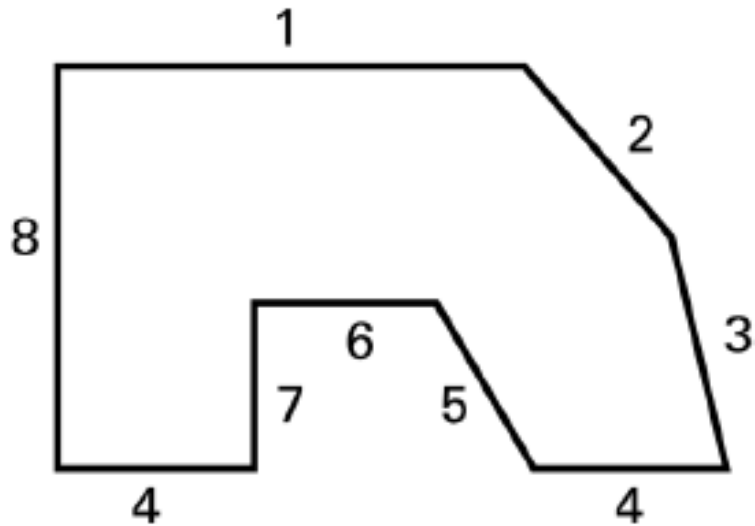


Most of the buildings have 4 façades.
The sun protection of each façade should be controlled separately.



Even in buildings with a U-shape, only 4 façades are to be controlled differently, as several are aligned in the same way

Classification of the Façades

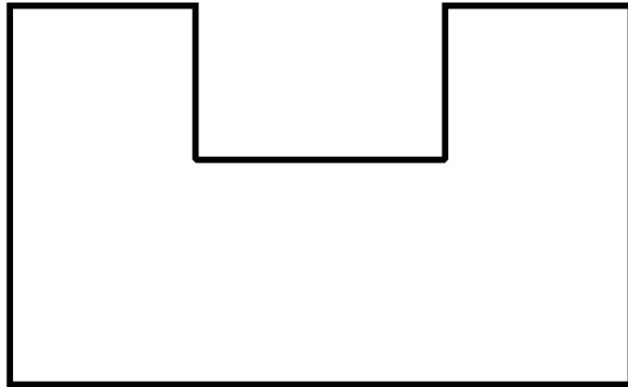


For buildings with asymmetrical the façades with non-rectangular orientation (2, 3, 5) and recessed façades (6) must be controlled separately.

Curved/circular façades should be divided into several façades segments to be controlled individually.

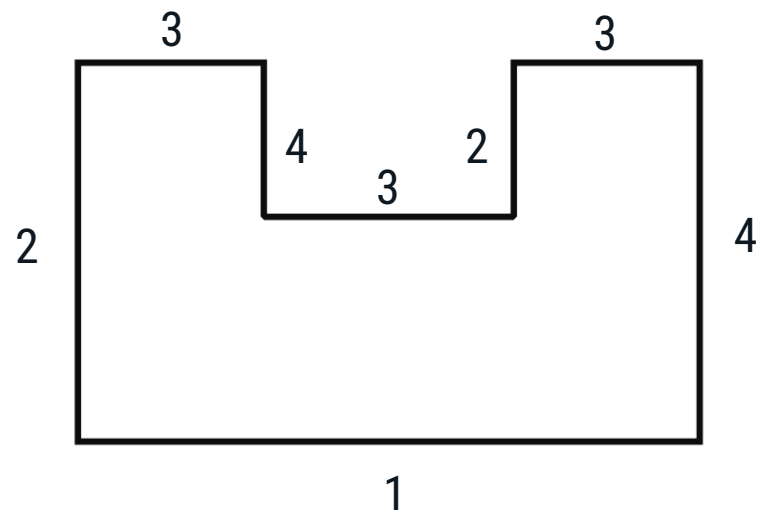
Practical Exercise

How many façades does this building have?



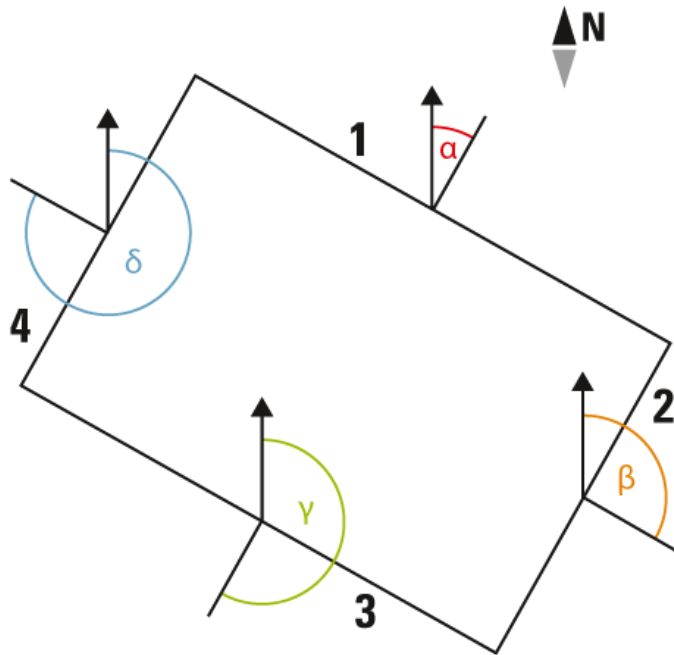
Solution to Exercise

The building has 4 façades



Alignment of the Façades

Path in the ETS : Suntracer KNX pro > Facades > Facade X: Automation



Example: If the building is rotated by $\alpha = 30^\circ$, then the façade alignment for facade 1 = 30° , facade 2 = 120° , facade 3 = 210° and facade 4 = 300° .

The Façade alignment corresponds to the angle between the north-south axis and the perpendicular to the façade. The angle α is measured in a clockwise direction.

The façade alignments are as follows:

Façade 1: Angle α

Façade 2: Angle $\beta = \alpha + 90^\circ$

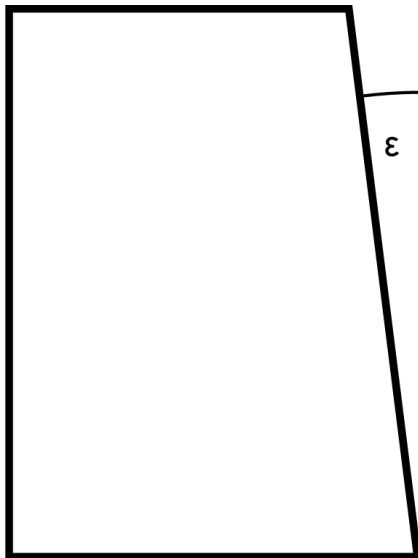
Façade 3: Angle $\gamma = \alpha + 180^\circ$

Façade 4: Angle $\delta = \alpha + 270^\circ$.

Façade alignment
(North=0°,O=90°,S=180°,W=270°)

Angle of Inclination of the Façade

Path in the ETS : Suntracer KNX pro > Facades > Façade X: Automation



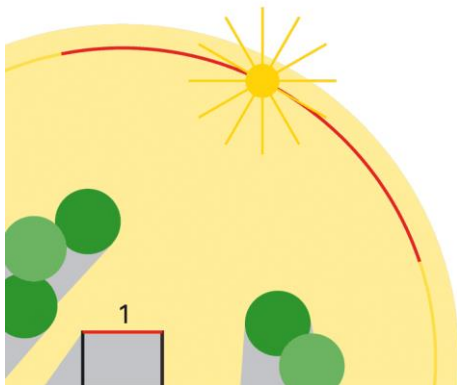
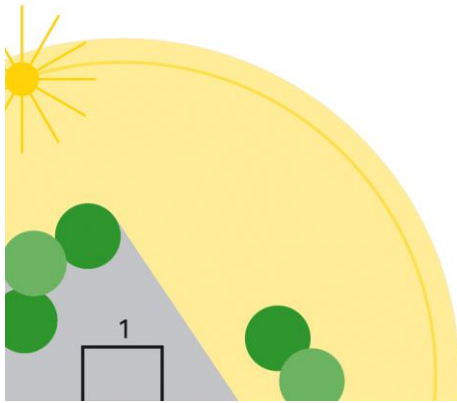
If a facade surface is not vertically aligned, this must be taken into account.

An inclination of the facade to the front is counted as a positive angle, an inclination to the rear (as in the illustration) as a negative angle.

Solar protection position	Slat tracking
Movement position (in %)	100
Façade alignment (North=0°,O=90°,S=180°,W=270°)	180
Inclination of the façade in ° (0° = no inclination)	0

Sun Direction (Azimuth)

Path in the ETS : Suntracer KNX pro > Facades > Facade X: Automation



● = Baum, Bäume, Hecke □ = Gebäude

Sun protection automation

use No Yes

Analysis of the automatic sun release object 1 = activated | 0 = deactivated
 0 = activated | 1 = deactivated

Value up to 1st communication 0 1

Definition of ranges for sun direction and height per Parameter Communication object

Number of ranges for sun direction and height

1

Range 1

Sun direction South

from (in °) 90

to (in °) 270

Sun elevation Any height Angle range

from (in °) 0

to (in °) 90

Range 1

Sun direction Angle range

from (in °) 90

to (in °) 270

Sun elevation Any height Angle range

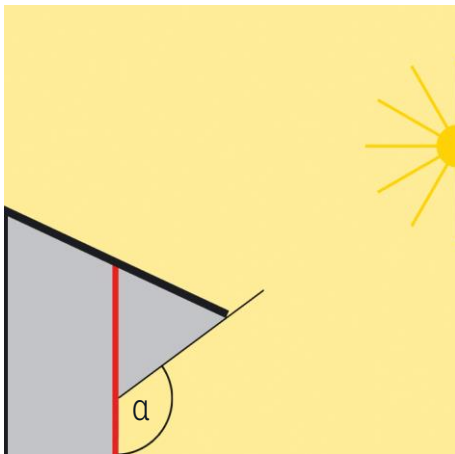
from (in °) 0

to (in °) 90

Sun Height (Elevation)

Set elevation sun height

Path in the ETS : Suntracer KNX pro > Facades > Facade X: Automation



Sun protection automation

use No Yes

Analysis of the automatic sun release object 1 = activated | 0 = deactivated
 0 = activated | 1 = deactivated

Value up to 1st communication 0 1

Definition of ranges for sun direction and height per Parameter Communication object

Number of ranges for sun direction and height

Range 1

Sun direction

from (in °)

to (in °)

Sun elevation Any height Angle range

from (in °)

to (in °)

Brightness

Path in the ETS : Suntracer KNX pro > Facades > Facade X: Automation

Brightness sensor selection: Internal sensors (maximum value) via communication object

Preset threshold value for brightness per Parameter Communication object

Threshold value (in kLux)

Hysteresis threshold value in in percent (%) in kLux

Hysteresis (in kLux)

Travel delays

Retraction and extension delay is stipulated by Parameter Object

Extension delay (in minutes)

Brief delay (in seconds)

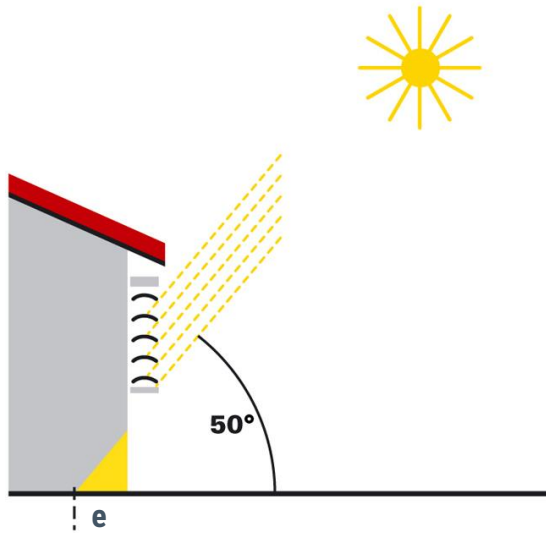
Retraction delay (in minutes)

Slat and Shadow Edge Tracking

Path in the ETS : Suntracer KNX pro > Facades > Facade X: Automation

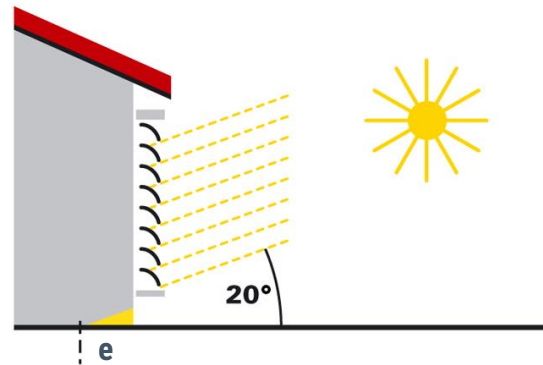
Solar protection position	Shadow edge tracking and slat tracking ▼
Façade alignment (North=0°,O=90°,S=180°,W=270°)	without tracking
Inclination of the façade in ° (0° = no inclination)	Slats in 4 stages
Window height in cm	Slat tracking
	Shadow edge tracking
	Shadow edge tracking and slat tracking ✓
Façade alignment (North=0°,O=90°,S=180°,W=270°)	180 ▲▼
Inclination of the façade in ° (0° = no inclination)	0 ▲▼
Window height in cm	150 ▲▼
Max. penetration depth of sun into the room in cm	50 ▲▼
Shadow edge displacement at or above ... cm will be tracked	10 ▲▼

Slat and Shadow Edge Tracking



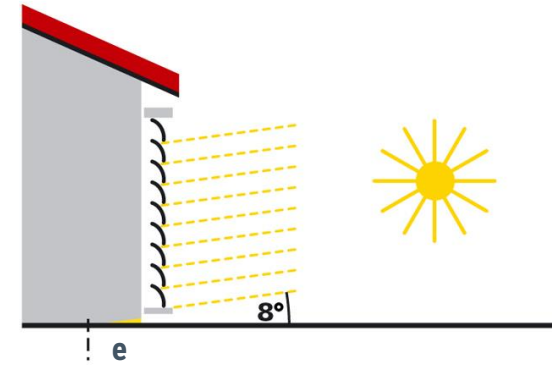
Sunshade when the position of the sun is high

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 (e).



Sunshade when the sun is in a middle 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.



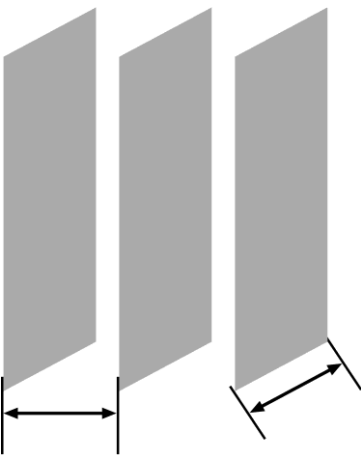
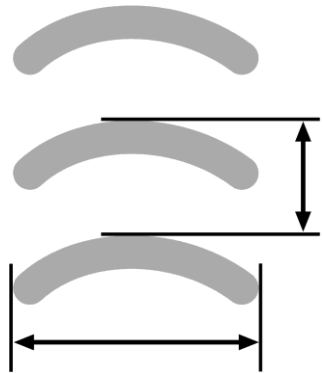
Sunshade when the position of the sun is low

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

Details for Slat Setting

Determine Slat Type, Width and Distance

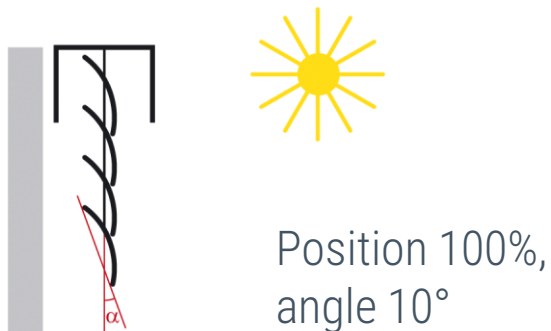
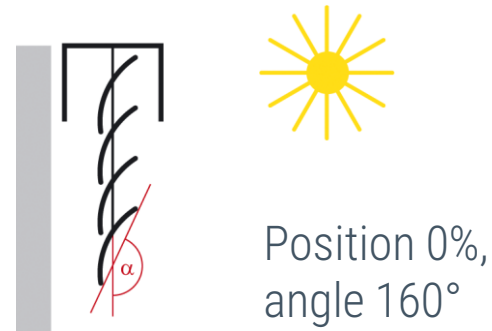
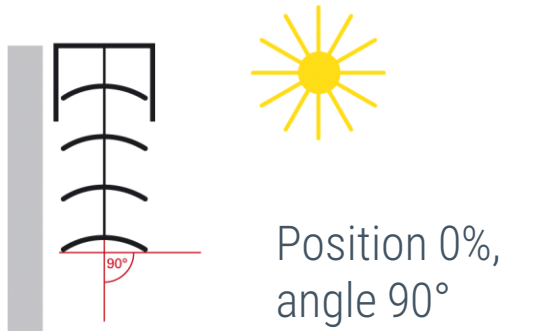
Path in the ETS : Suntracer KNX pro > Facades > Facade X: Automation



Solar protection position	Slat tracking
Movement position (in %)	100
Façade alignment (North=0°,O=90°,S=180°,W=270°)	180
Inclination of the façade in ° (0° = no inclination)	0
Slat orientation	<input checked="" type="radio"/> Horizontal <input type="radio"/> Vertical
Slat width (in mm)	80
Slat distance (in mm)	75
Min. angle change for sending new slat position	10
Slat angle (in °) after 0% slat movement command	90
Slat angle (in °) after 100% slat movement command	10

Slat Position for Horizontal Slats

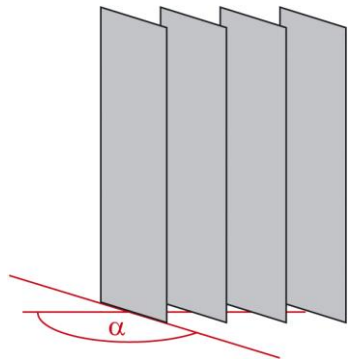
The angle at slat position 0% depends on the mechanics of the curtain and the actuator



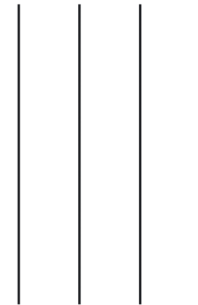
Slat angle (in °) after
0% slat movement command

Slat angle (in °) after
100% slat movement command

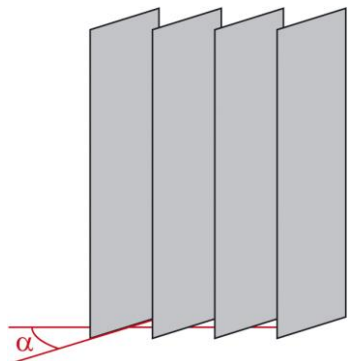
Slat position for vertical slats



Position 0%,
angle 90°



Position 0%,
angle 130°



Position 100%,
angle 10°

Slat angle (in °) after
0% slat movement command

Slat angle (in °) after
100% slat movement command

Façade Protection

Path in the ETS : Suntracer KNX pro > Facades > Façade X: Function, safety

Frost alarm

use

No Yes

Note: If there has been no measurement change at the outdoor

temperature sensor within 48 hours, frost alarm will be triggered.

Frost alarm parameters adjustable in the "Façades" menu

Rain

use

No

Frost alarm

Preset of frost protection values per

Parameter Object

Start frost alarm if an

outdoor temperature of
(in 0.1°C)

20

is underrun,
during or up to

(in hours)

5

after precipitation.

End frost alarm if an

outdoor temperature of
(in 0.1°C)

50

is exceeded for more than

(in hours)

5

Façade Status Output

Path in the ETS : Suntracer KNX pro > Facades > Facades

Texts that are output with object
"Façade X channel status bit text"

Block automation using communication object	Auto. Sperre
Wind extension block status	Windausfahrsp.
Wind alarm status	Windalarm
Rain alarm status	Regenalarm
Rain automation status	Regenautomatik
Frost alarm status	Frostalarm
Safety status	Sicherheit
Time open status	Zeitöffnen
Outdoor temperature block status	A-temp Sperre
Night closure status	Nachtschließen
Timed closure status	Zeitschließen
Heat protection status	Hitzeschutz
Pyranometer status	Pyranometer
Indoor temperature blocking status	I-Temp Sperre
Sun shining on façade Status	Sonne auf Fass
Sun bright, short retraction delay status	Hellig. kurz
Sun bright, long retraction delay status	Hellig. lang

648	Façade X channel status output (1: activate)	Input
649	Façade X channel name	Output
650	Façade X channel (1:+ 0:-)	Input
651	Façade X channel state text	Output
652	Façade X channel status bit text	Output
653	Façade X channel status bit state	Output
654	Façade X channel delay	Output
655	Façade X channel status bit selection (1:+ 0:-)	Input
672	Façade 1 block (1 = Block 1, 0 = Release)	Input
800	Façade 2 status output channel (1: activate)	Input
801	Façade 2 state text	Output
802	Façade 2 channel status bit text	Output
803	Façade 2 channel status bit state	Output
804	Façade 2 channel delay	Output
805	Façade 2 channel status bit selection (1:+ 0:-)	Input
1120	Computer 1 Input 11	Input

Exercise

What alarms for façade automation have we learned about?

Solution to Exercise

What alarms for façade automation have we learned about?

Solution c) is correct:

Rain, Frost, Wind

2nd Module | Summary

Open Q&A Session / Feedback on the Webinar

- Wishes
- Suggestions
- Future webinars



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