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

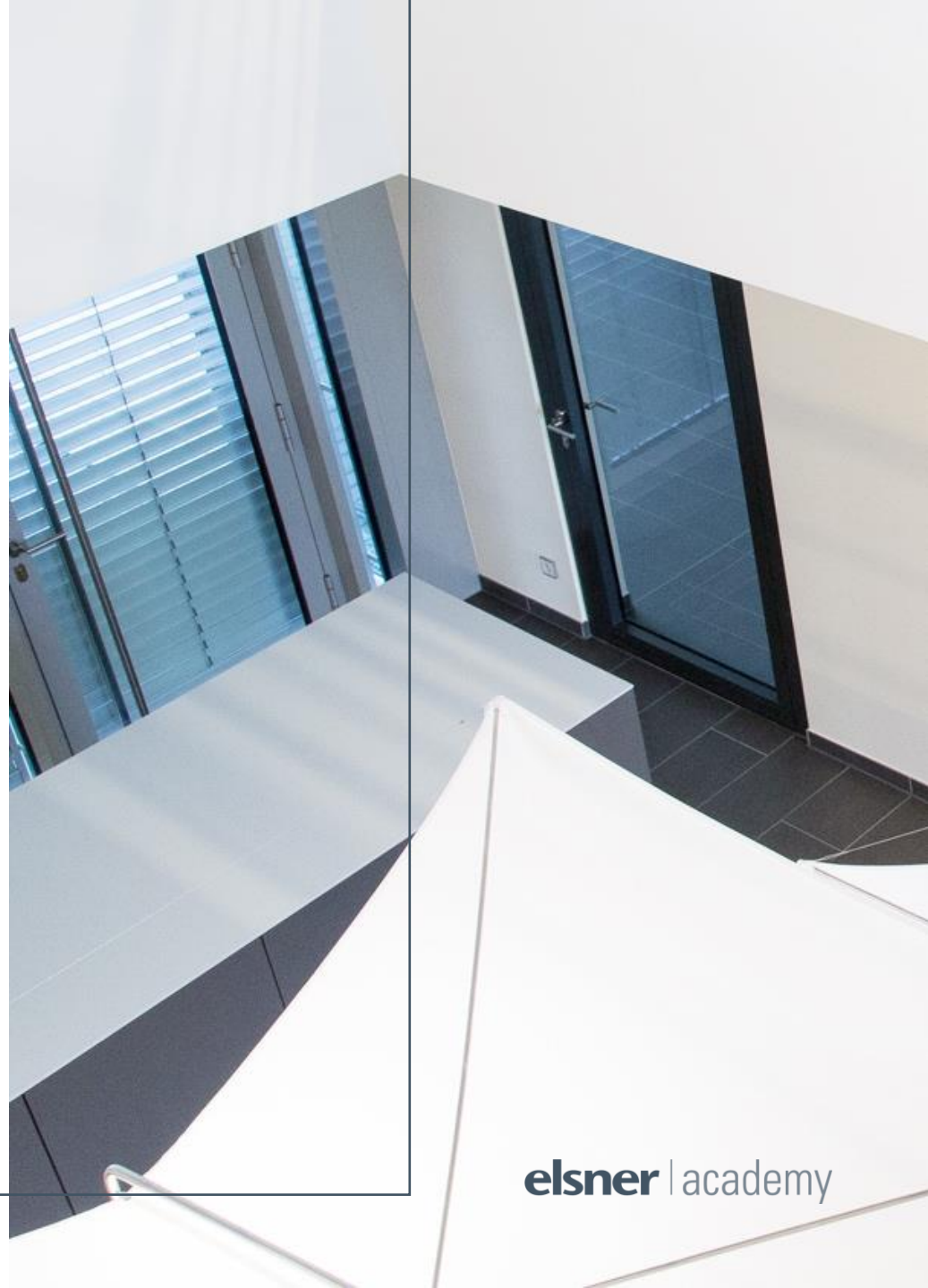
After this webinar, you will be able to:

- ✓ 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



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1 a | Comparison and Overview

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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

Windancer 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 × façade	8 × façade	6 × façade	5 × façade	5 × façade	8 × shading	–	–
Tracking of slats & shadow edge	✓	✓	✓	–	–	✓	–	–
Time Switch	✓	✓	✓	✓	✓	✓	–	only time/date
Calculator modules	✓	✓	–	✓	–	–	–	–

1 b | Mounting of Weather Stations

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Mounting of Type “sl”

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

Mounting of Suntracer KNX pro

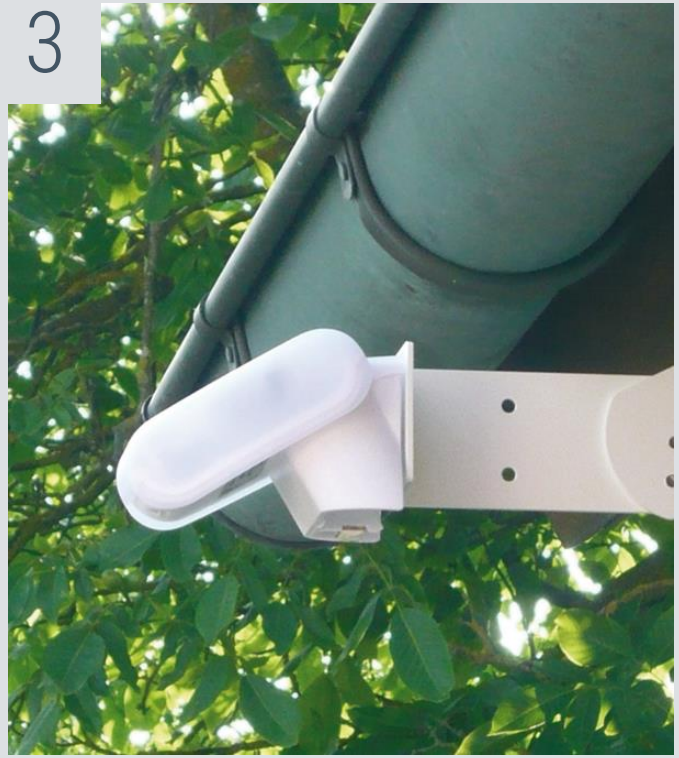
Practical Exercise

Which weather station is correctly installed?

1

2

3



Solution to Exercise

Answer: Picture no. 3 shows the correct installation

3

1st Module | Summary

2 a | Special Features Suntracer KNX pro

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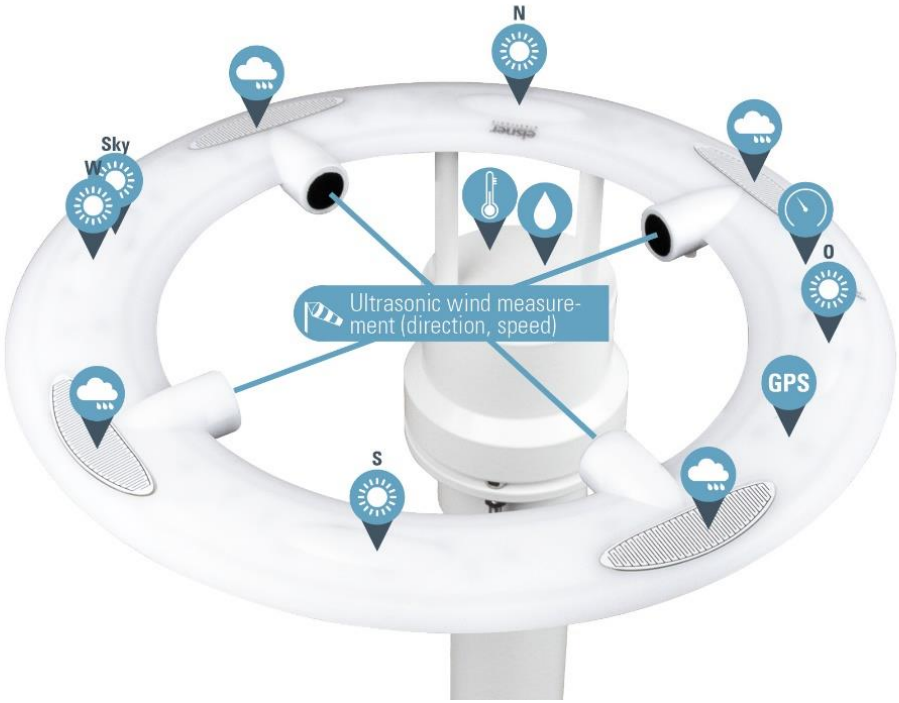
Features Suntracer KNX pro

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

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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.).

Swiching 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	not
Threshold value setpoint per	(•) Parameter ( ) Communication object
Threshold value in 0.1 m/s	80
Hysteresis setting	( ) in % (•) absolute
Hysteresis in 0.1 m/s	20

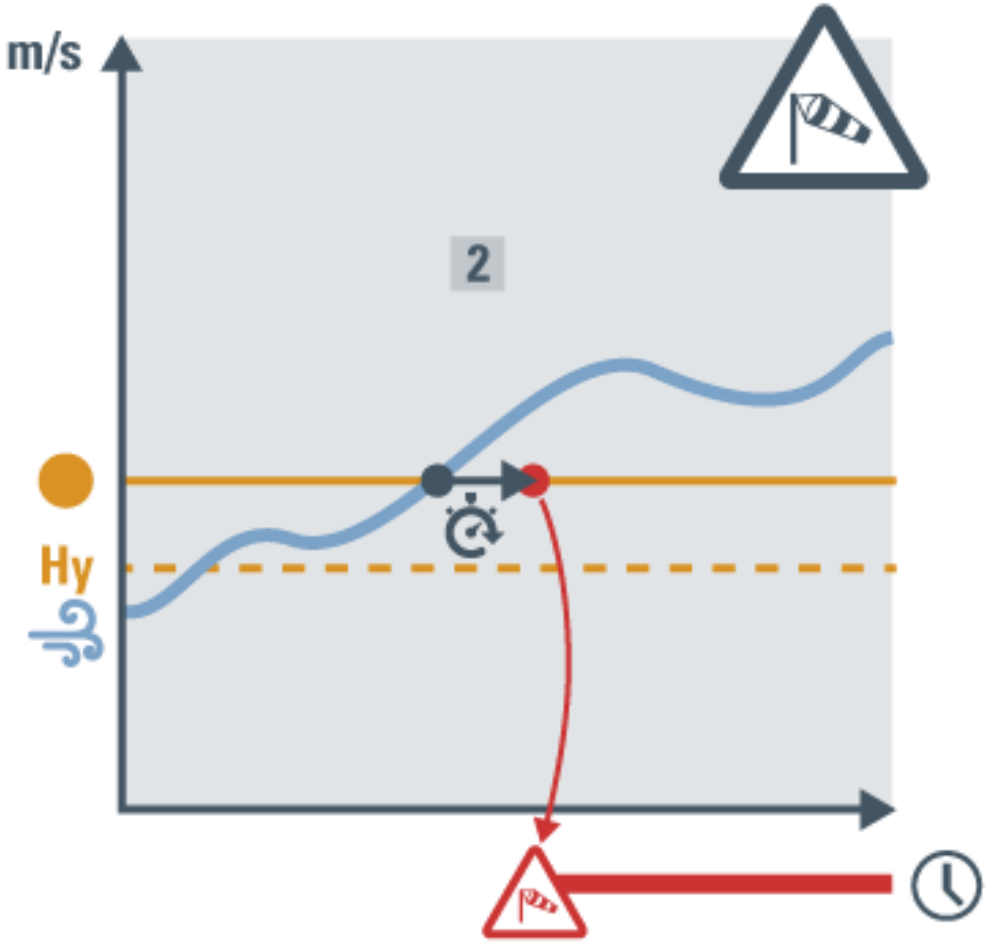
Swiching output:

Output is at (TV = threshold value)	TV above = 1 | TV - Hyst. below = 0
Delays can be set via objects (in seconds)	(•) No ( ) Yes
Delay from 0 to 1	2 sec
Delay from 1 to 0	5 min
Send switching outputs	on change and periodically
Cycle	5 sec

Block:

Use block of the switching ouput	( ) 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	do not send telegram
Action when releasing (with 2 seconds release delay)	Status object/s send/s

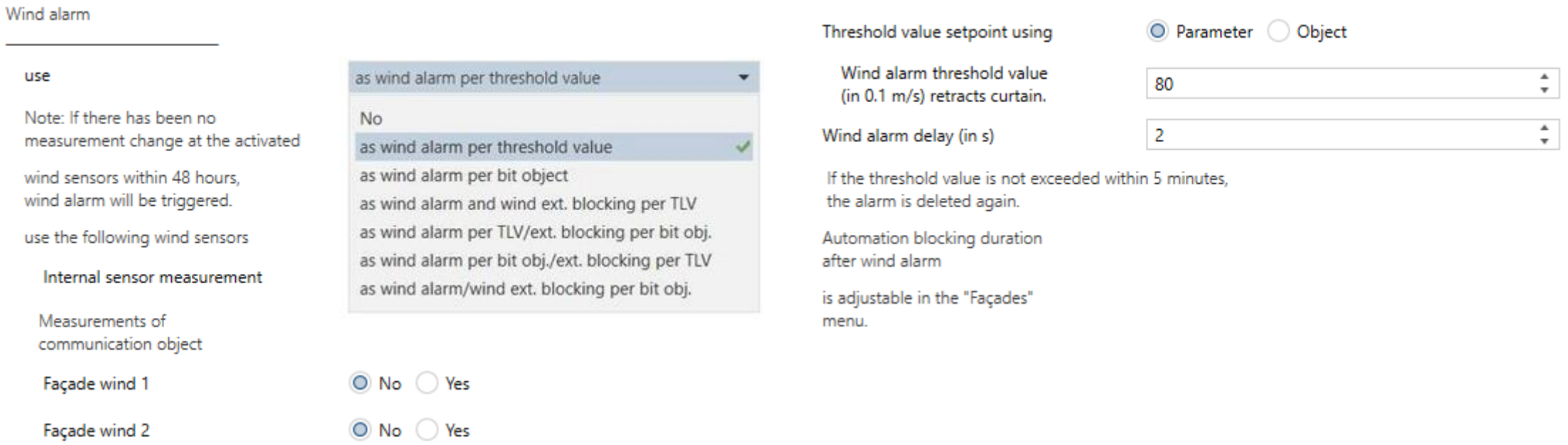
Wind Threshold Value



Wind Threshold Values in the Façade Control System

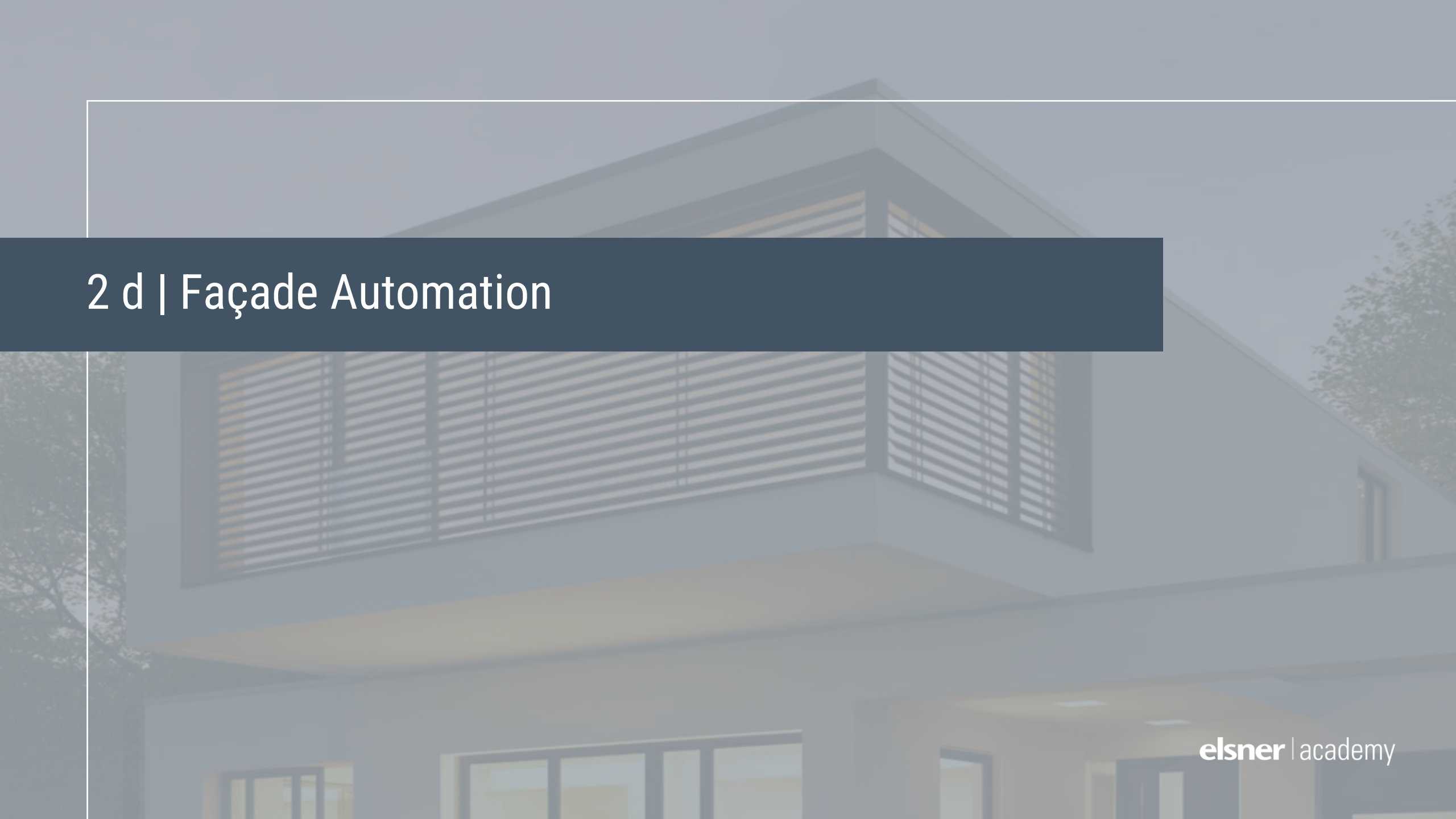
Setting in the façade and wind threshold value

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



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

2 d | Façade Automation



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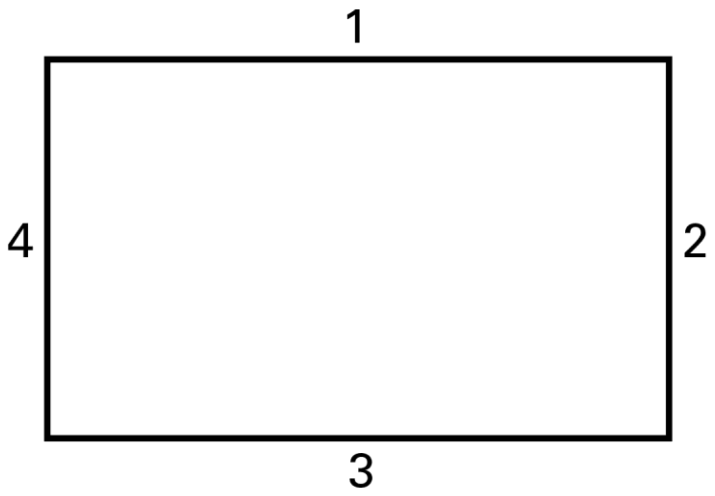
Functions of the Façade Control

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

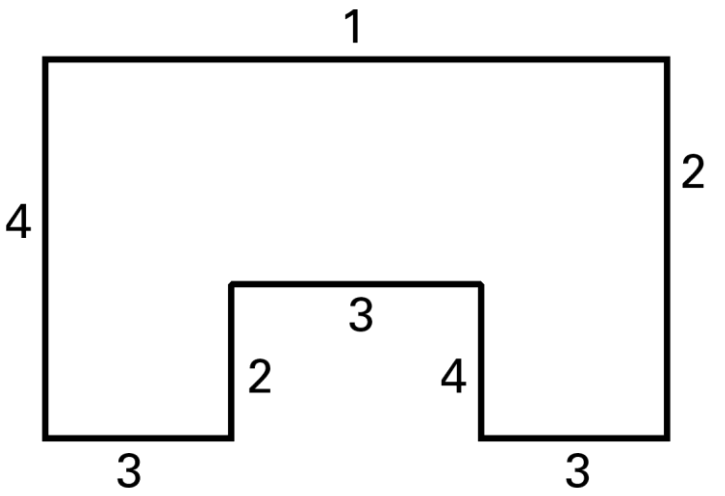
Separate section with protective functions for the façade

- Windspeed
- Frost
- Rain

Classification of the Façades

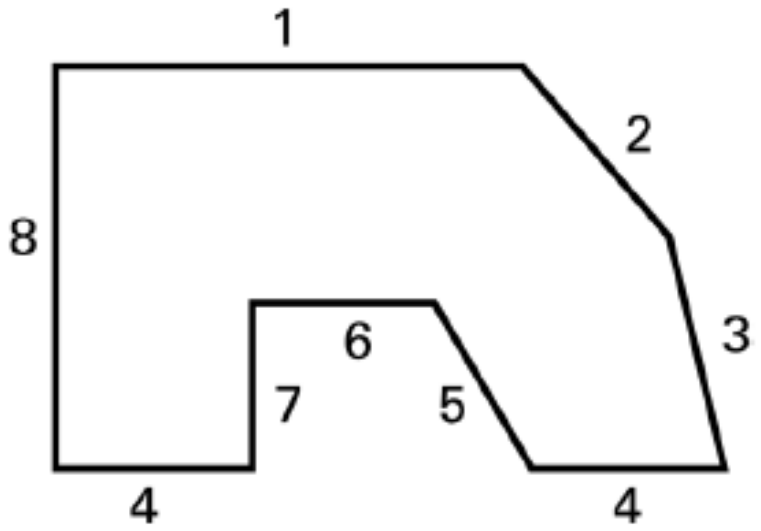


Most of the buildings have 4 facades.
The sun protection of each façade should be controlled separately.



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

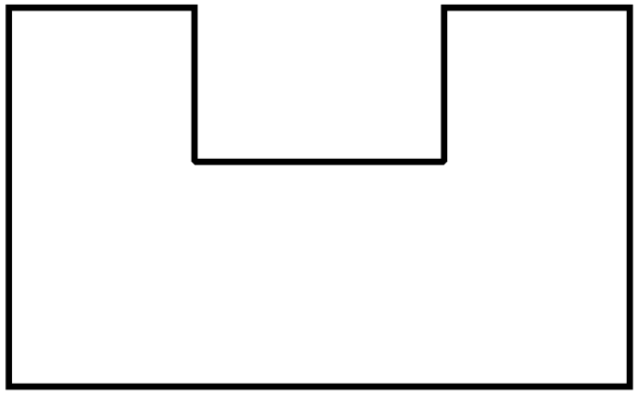
Classification of the Façades



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.

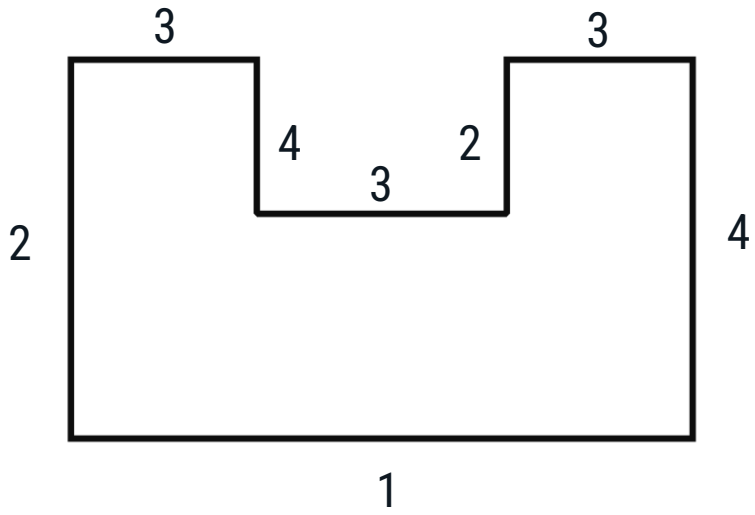
Practical Exercise

How many façades does this building have?



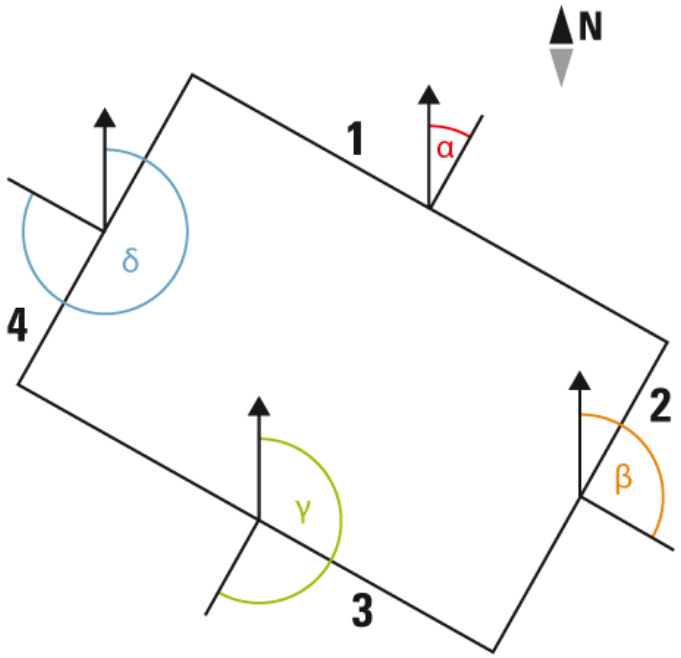
Solution to Exercise

The building has 4 façades



Alignment of the Façades

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



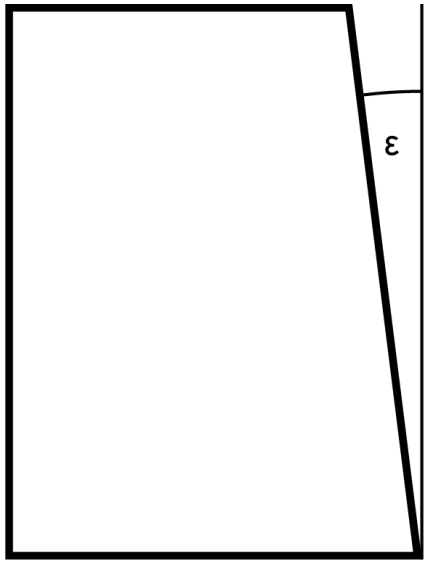
The Façade alignment corresponds to the angle between the north-south axis and the perpendicular to the façade. The angle α is measured in a clockwise direction.

The façade alignments are as follows:
Façade 1: Angle α
Façade 2: Angle β = α + 90°
Façade 3: Angle γ = α + 180°
Façade 4: Angle δ = α + 270°.

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

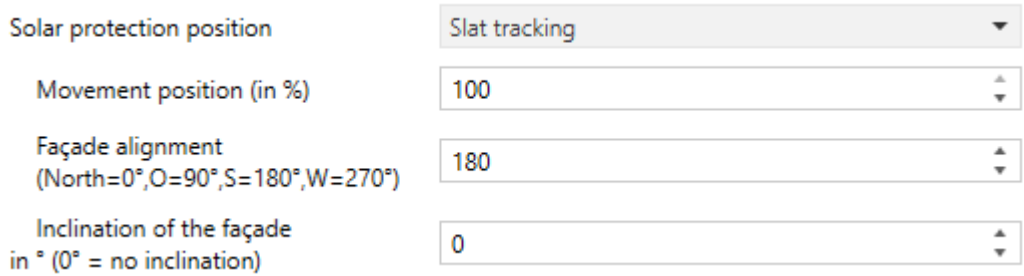
Angle of Inclination of the Façade

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



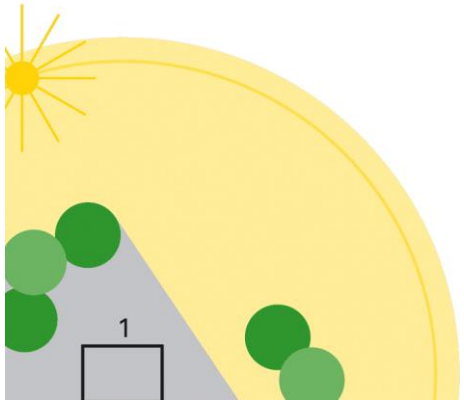
If a facade surface is not vertically aligned, this must be taken into account.

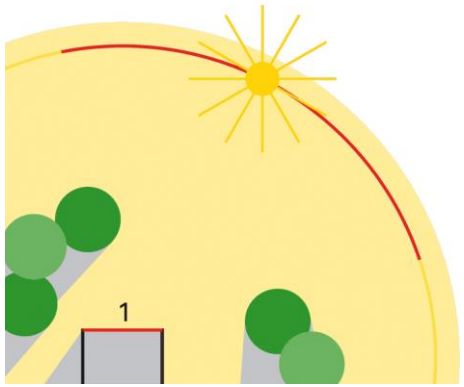
An inclination of the facade to the front is counted as a positive angle, an inclination to the rear (as in the illustration) as a negative angle.



Sun Direction (Azimuth)

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





= Baum, Bäume, Hecke = Gebäude

Sun protection automation

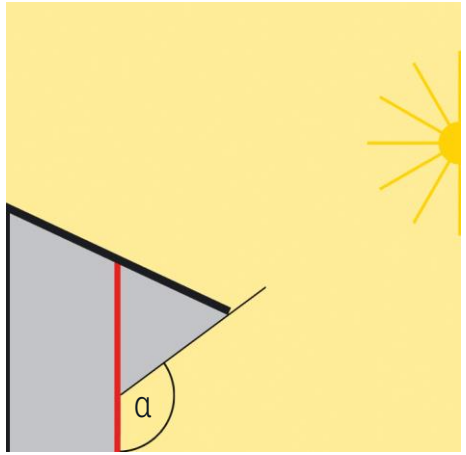
use	No / Yes
Analysis of the automatic sun release object	1 = activated | 0 = deactivated / 0 = activated | 1 = deactivated
Value up to 1st communication	0 / 1
Definition of ranges for sun direction and height per	Parameter / Communication object
Number of ranges for sun direction and height	1
Range 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

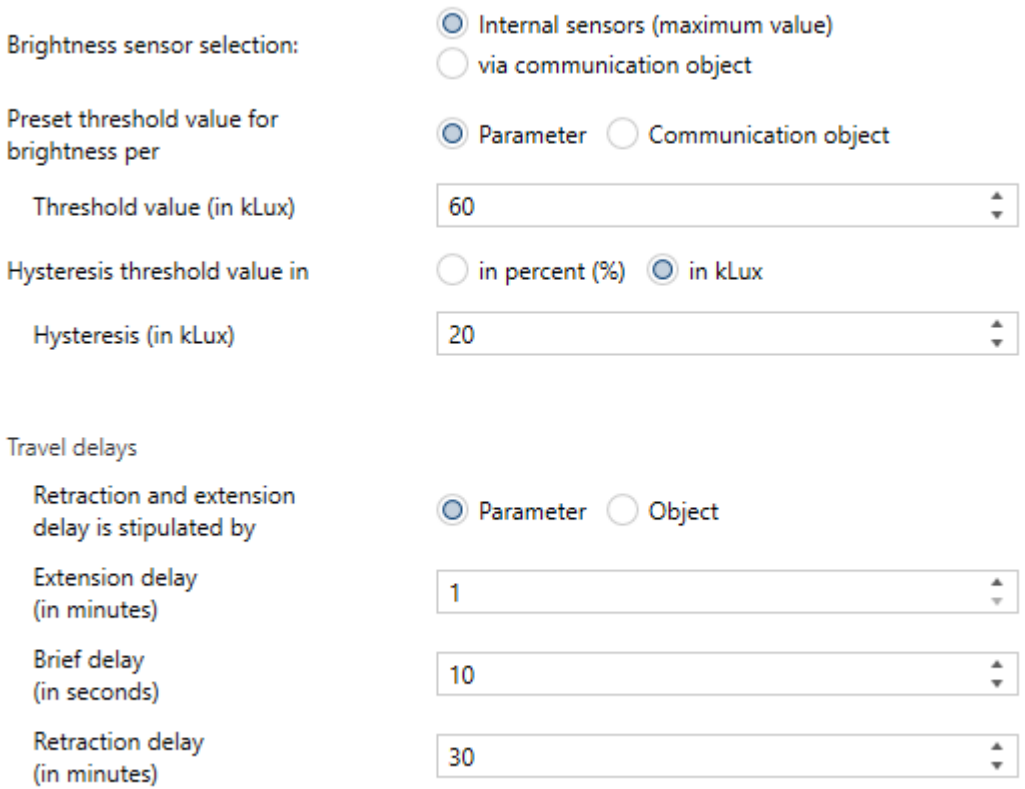


Sun protection automation

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	1
Range 1	
Sun direction	Angle range
from (in °)	90
to (in °)	270
Sun elevation	Any height / Angle range
from (in °)	0
to (in °)	90

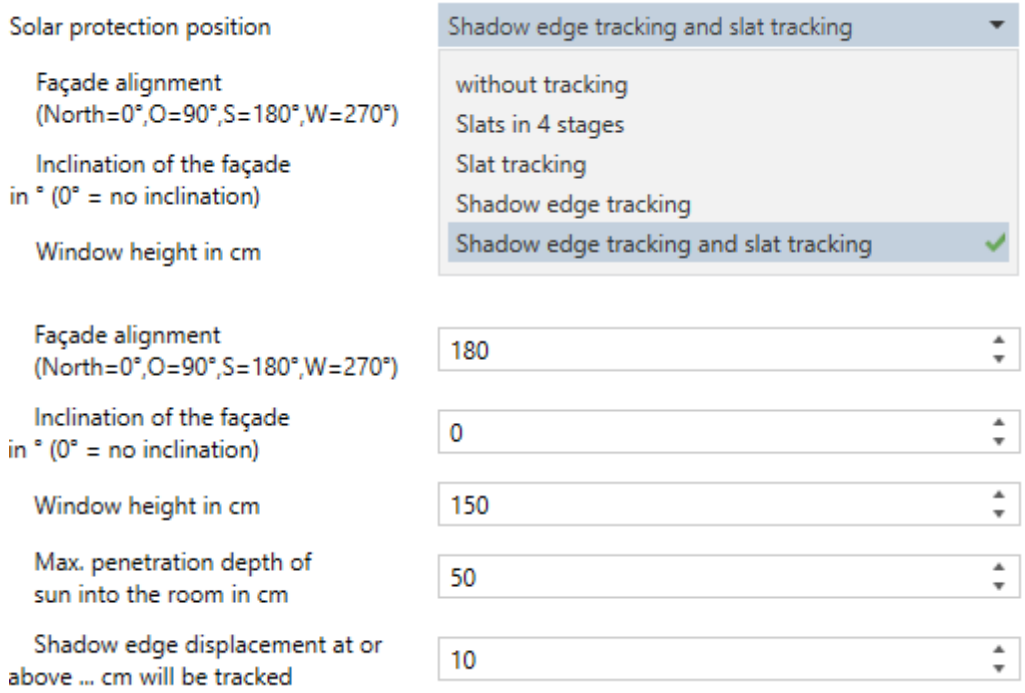
Brightness

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

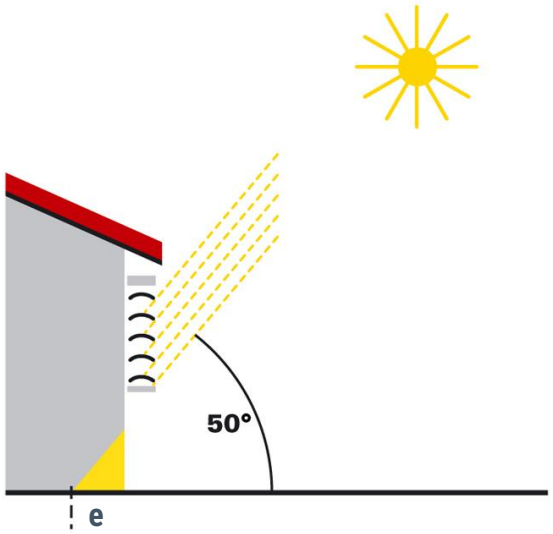


Slat and Shadow Edge Tracking

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

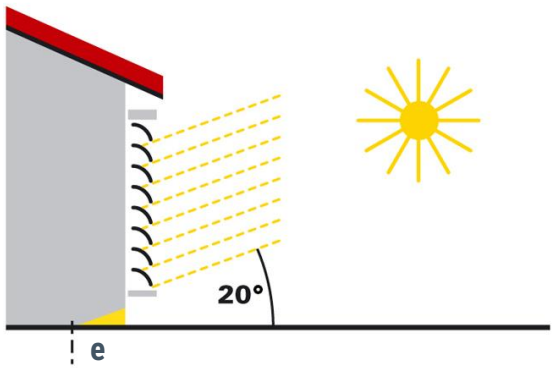


Slat and Shadow Edge Tracking



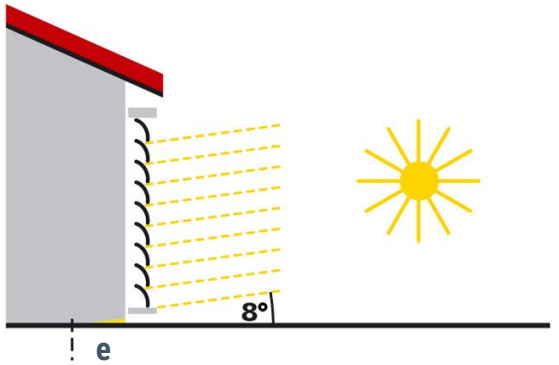
Sunshade when the position of the sun is high

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.



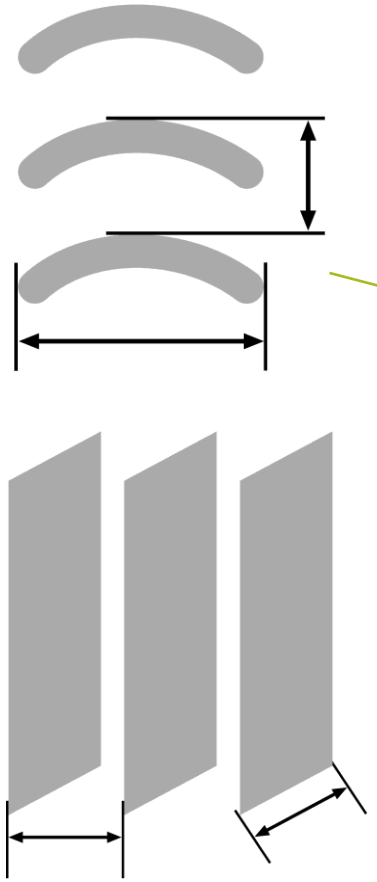
Sunshade when the position of the sun is low

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

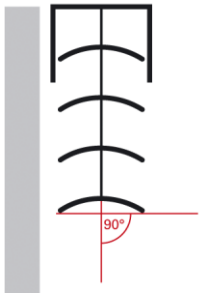
Path in the ETS : Suntracer KNX pro > Facades > Facade X: Automation



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	Horizontal / 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

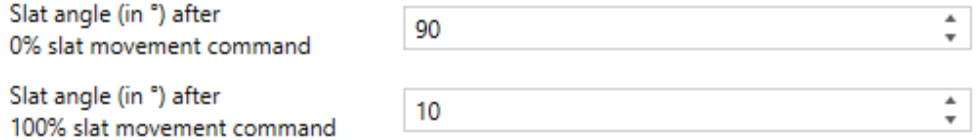
The angle at slat position 0% depends on the mechanics of the curtain and the actuator



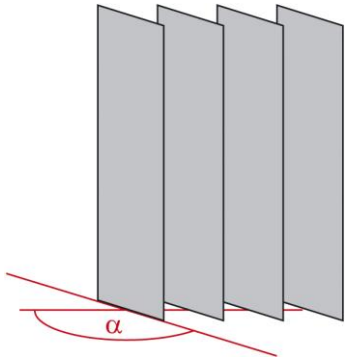
Position 0%,
angle 90°

Position 0%,
angle 160°

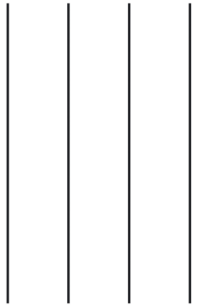
Position 100%,
angle 10°



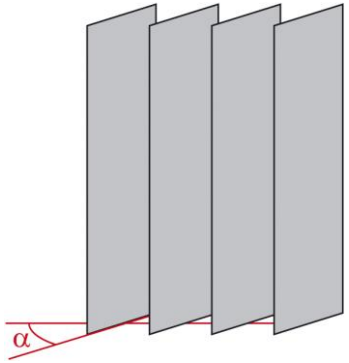
Slat position for vertical slats



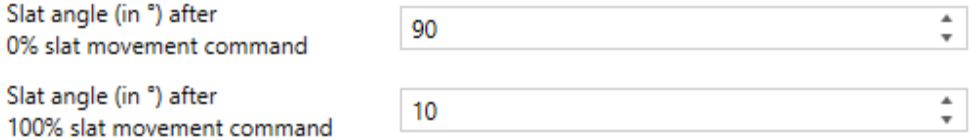
Position 0%,
angle 90°



Position 0%,
angle 130°



Position 100%,
angle 10°



Façade Protection

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

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

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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