Saving Energy with KNX Weather Stations 2

Blind Control for Complex Buildings

Bastian Elsner | 01.07.2025

» We are your speakers today

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- Responsibility: marketing, sales, development, production, purchasing, logistics, service

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- Product Manager at Elsner Elektronik GmbH
- Practical experience as a KNX system integrator and in sales

What do you notice about this façade?

- High heat input from the sun on the glass façade
- Without shading, high cooling capacity of air conditioning systems required
- No glare protection available

- Heat load in rooms ⟶ high cooling costs

Solution - Automated shading

Smart system with KNX weather station

In summer:

- Reduction of direct sunlight
- Reduced operation of air conditioning systems
- Saving of cooling energy
- Glare protection

In winter:

- Intelligent slats let in targeted sunlight
- Passive solar heat gains
- Thermal comfort through daylight control
- Less heating energy required
- Glare protection

Learning goals

After this webinar you will be able to:

- ✓ to implement a fully comprehensive shading control system
- ✓ to save and use energy through intelligent sun protection
- ✓ to supplement the system with additional façades

AGENDA

1. Model comparison and function overview
2. Functions and special features of Suntracer KNX Pro
3. Parameterization of the façade automation
4. Configuration of protective functions
5. Energy saving through intelligent parameterization
6. Installation and troubleshooting
7. Integration of additional façades

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01 | MODEL COMPARISON & FUNCTION OVERVIEW

KNX weather stations

Overview

Windancer KNX

- Mechanical wind sensor
- GPS optional
- Conventional applications
- Power supply via KNX bus possible

Suntracer KNX(-GPS), basic, light

- Electronic wind measurement
- Different versions available

Suntracer KNX sl (light, basic)

- Broad spectrum
- Electronic wind measurement
- Design-oriented, "invisible"

Suntracer KNX pro

- High performance
- Ultrasonic technology
- Automates up to 12 facades
- Wind direction detection

Comparison of KNX weather stations

Name	BX8	P04-KNX-GPS	Suntracer KNX sl basic	Windancer KNX	Windancer KNX-GPS	Suntracer KNX-GPS light	Suntracer KNX sl light	Suntracer KNX-GPS	Suntracer KNX sl	Suntracer KNX pro
Item number	71240	71230	70156	71235	71236	3094/3090	70155	3093	70154	70900
Air humidity	–	–	–	–	–	–	–	–	–	✓
Wind direction	–	–	–	–	–	–	–	–	–	✓
Air pressure	–	–	–	–	–	–	–	–	✓	✓
Temperature	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wind measurement	–	electronic	electronic	mechanical	mechanical	electronic	electronic	electronic	electronic	electronic
Automation	8 × Façade	–	–	–	8 × Façade	5 × Façade	5 × Façade	6 × Façade	8 × Façade	12 × Façade
Slat/shadow edge tracking	✓	–	–	–	✓	–	–	✓	✓	✓
Timer	–	Nur Uhrzeit	–	–	✓	✓	✓	✓	✓	✓
Calculator modules	–	–	–	–	–	–	✓	–	✓	✓

C1

Category 1:
Separate façade control and measuring sensor

C2

Category 2:
Façade automation can only be realized via logics

C3

Category 3:
Integrated façade control

02 | SPECIAL FEATURES SUNTRACER KNX PRO

Functions 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

Special features Suntracer KNX pro

| Overview

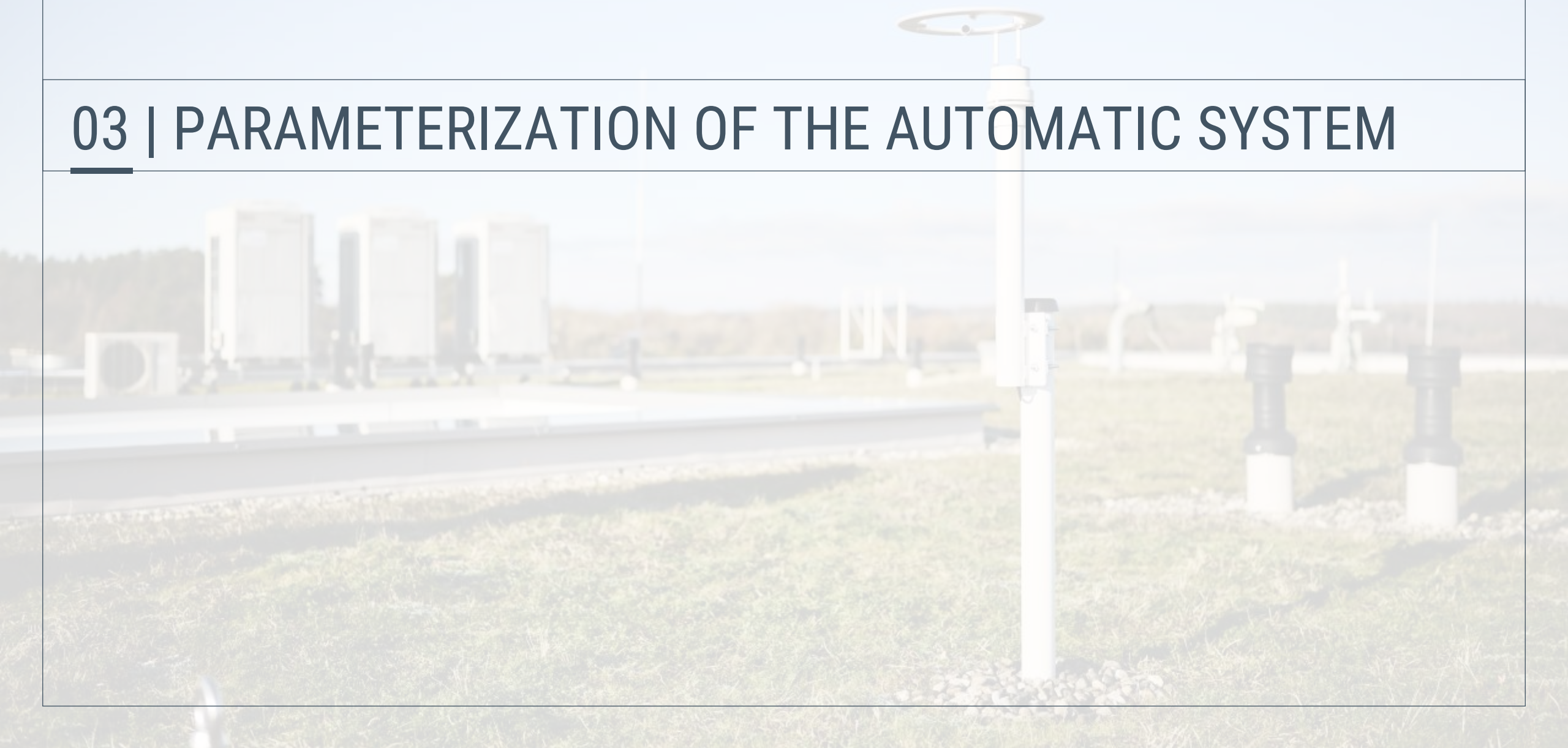
- Automatic function for 12 façades

- Display of the perceived temperature
- Wear-free wind measurement with ultrasound

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

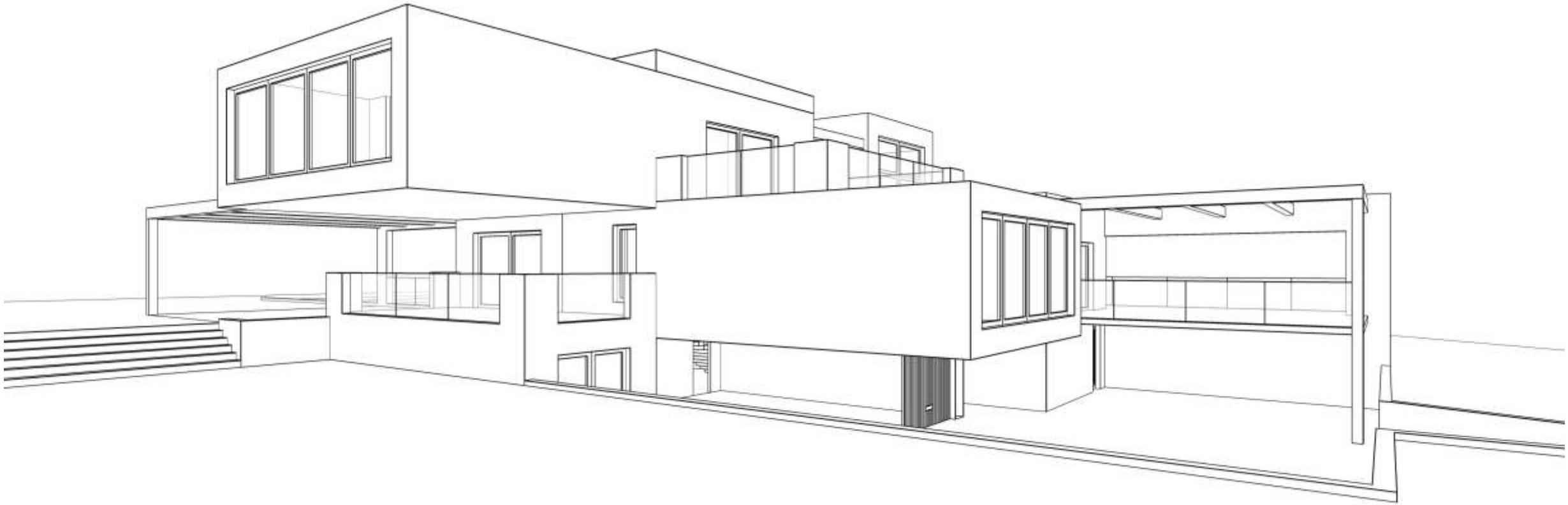
- KNX programming via magnetic push-button

03 | PARAMETERIZATION OF THE AUTOMATIC SYSTEM



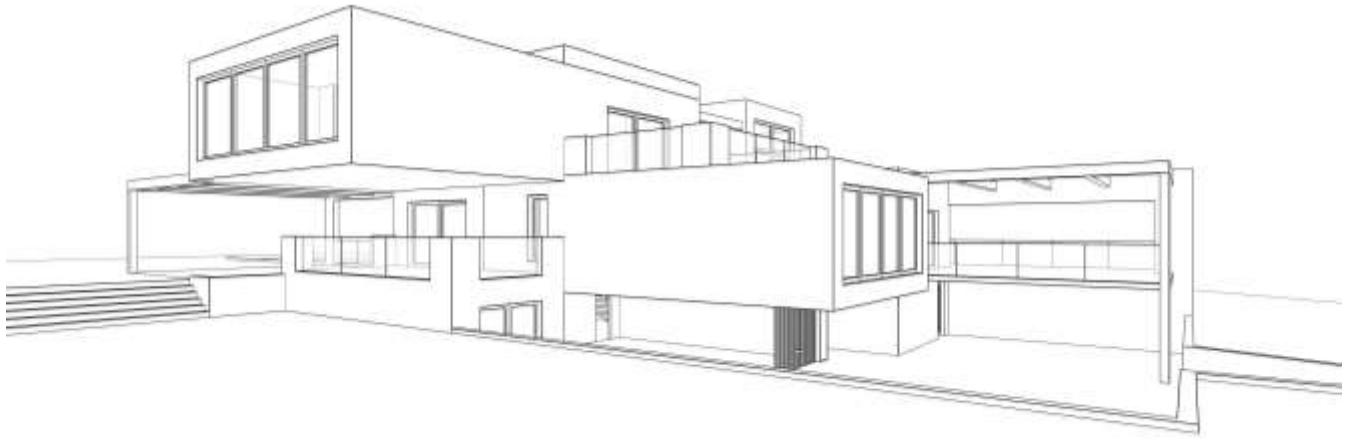
Building overview

| with different types of shading



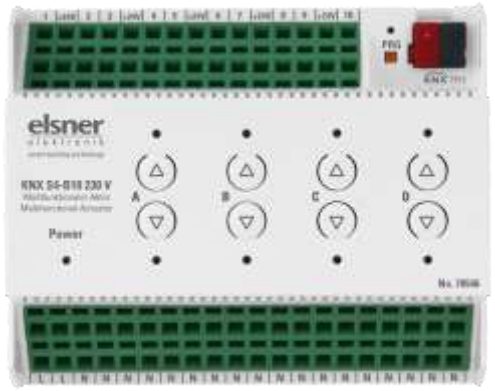
Building overview

| Weather station and KNX actuator



Suntracer KNX pro

KNX S4-B10 230 V



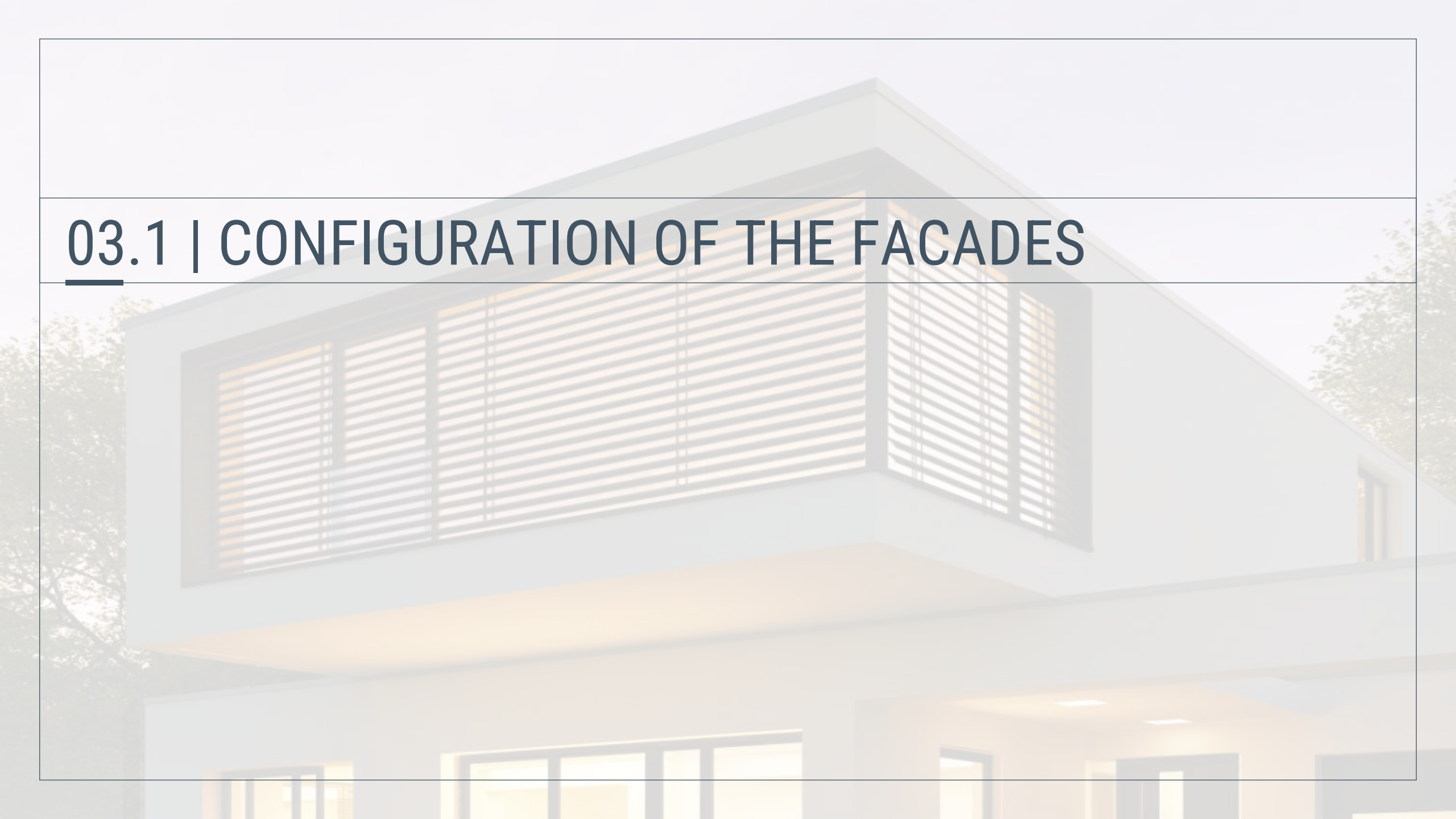
Task definition

Saving energy through smart building control

- In the following we would like to set up a complete façade control system.
- The brightness, sun direction/height and other parameters for saving energy on the building are configured in the façade control system.

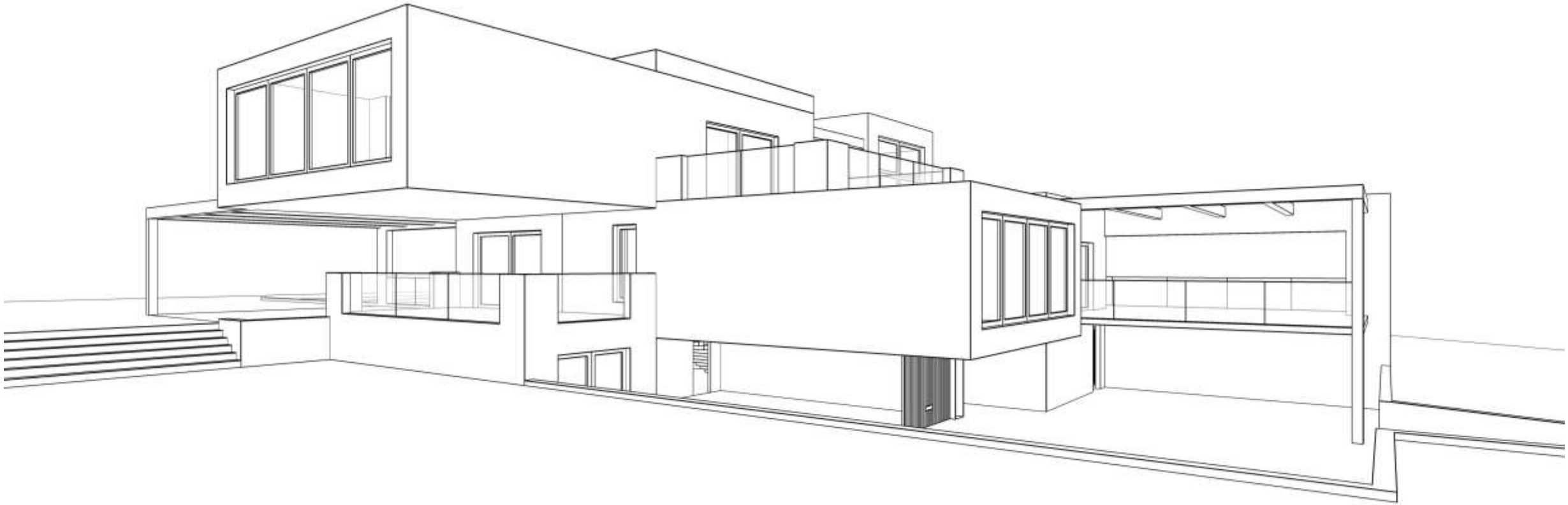
  We will take a detailed look at how this can be implemented in the following chapters.

03.1 | CONFIGURATION OF THE FACADES



Building overview

| with different types of shading



Façade control functions

| Configuration options

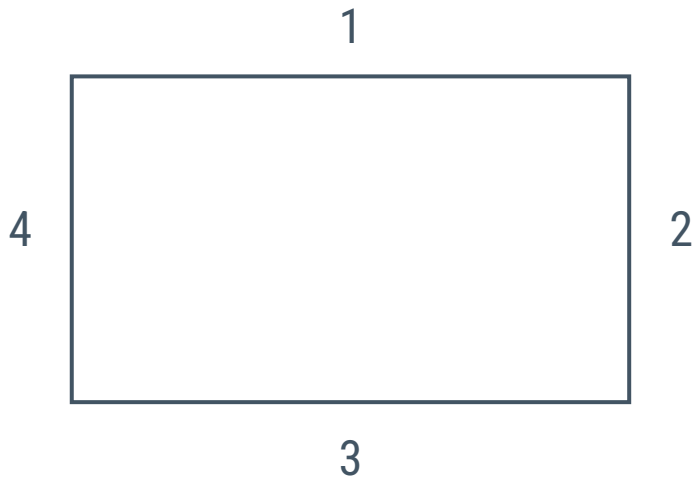
- Timers (timed opening/closing)
- Night closing
- Heat protection
- Pyranometer
- Automatic rain control
- Indoor temperature block
- Automatic sun protection
- Outdoor temperature block

Separate section with protective functions for the façade

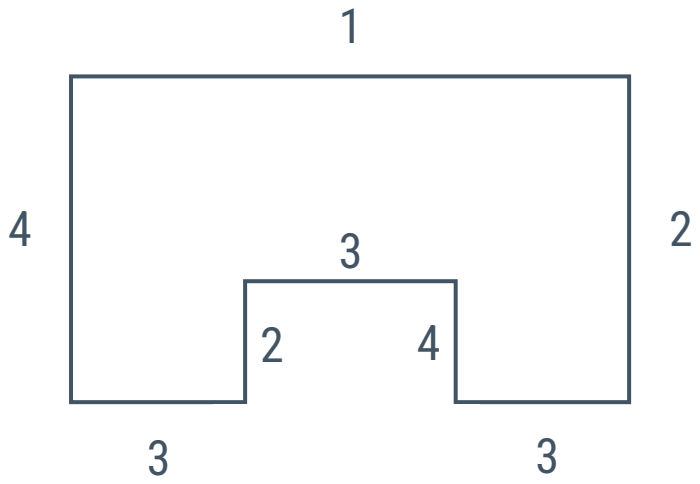
- Wind speed
- Rain

Classification of the façades

Simple façade structure



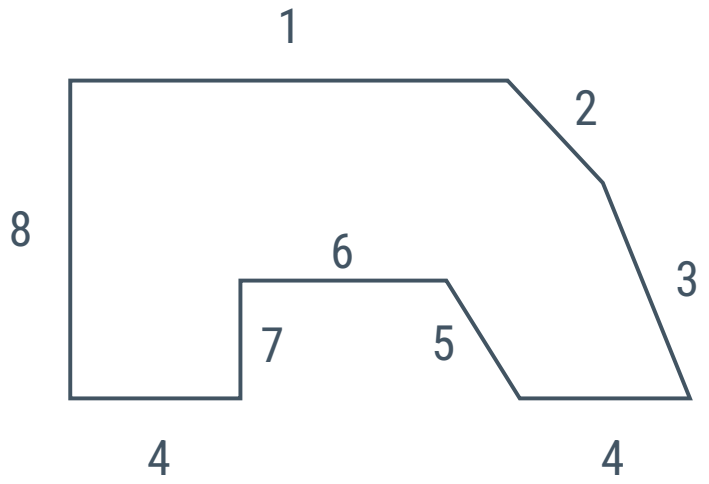
Most buildings have 4 façades.
The sun shading of each façade should be controlled separately.



Even in buildings with a U-shaped floor plan, only 4 façades need to be controlled differently, as several are aligned in the same way.

Classification of the façades

| Complex façade structure

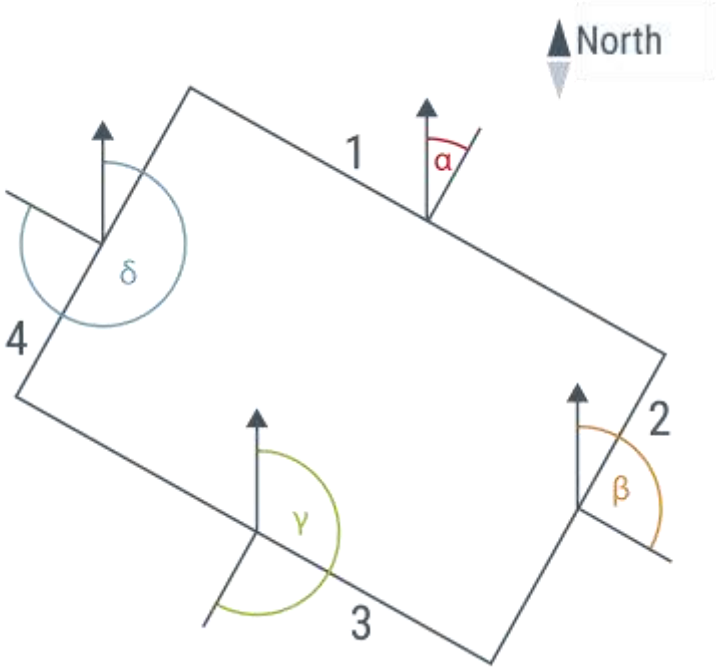


For buildings with an asymmetrical floor plan, the façades with non-rectangular alignment (2, 3, 5) and recessed façades (6) must be controlled separately.

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

Façade alignment

| Path in the ETS : **Suntracer KNX pro > Façades > Façade X: Automatic**



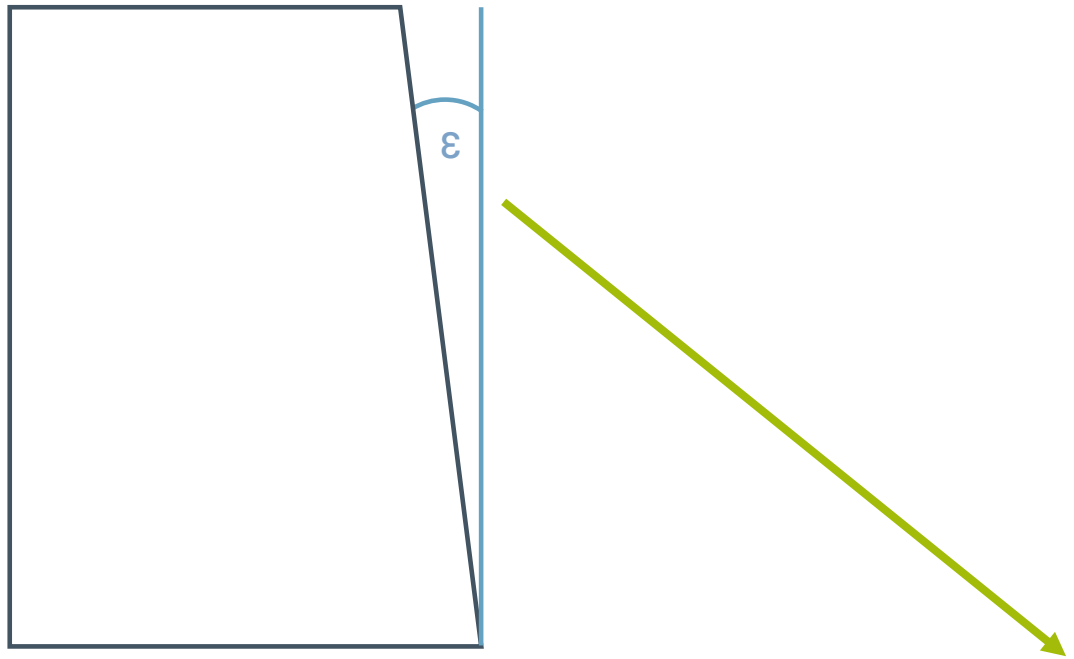
The façade alignment corresponds to the angle between the north-south axis and the perpendicular to the façade. The angle α is measured in a clockwise direction.

The façade orientations 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 orientation for façade 1 = 30°, façade 2 = 120°, façade 3 = 210° and façade 4 = 300°.

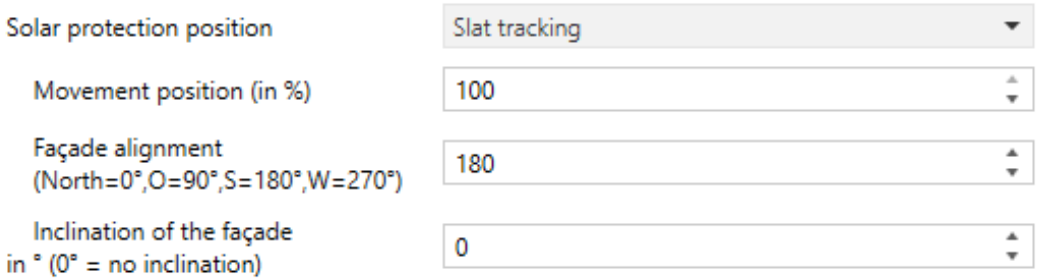
Inclination of the façade

| Path in the ETS : **Suntracer KNX pro > Façades > Façade X: Automatic**



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

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

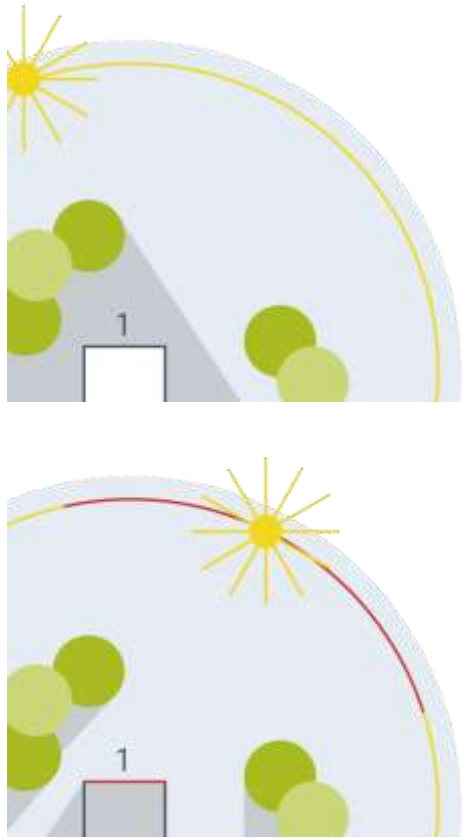


Do you have any questions about the façades?

03.2 | CONFIGURE AUTOMATIC SUN PROTECTION FOR THE FAÇADE

Direction of the sun

| Path in the ETS : **Suntracer KNX pro > Façades > Façade X: Automatic**



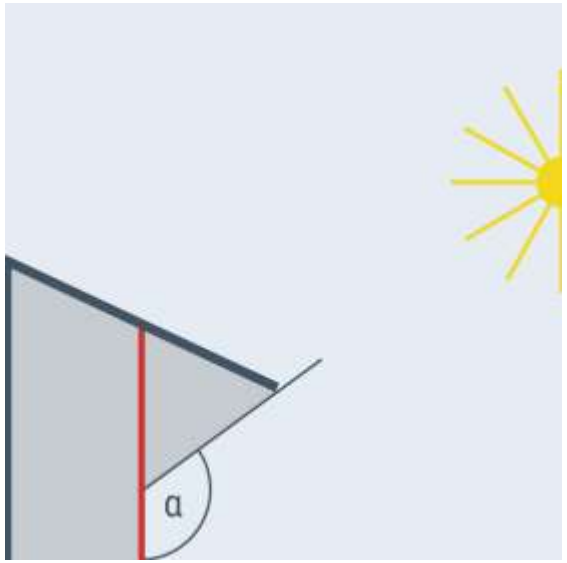
= Tree, trees, hedge = Building

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

Hight of the sun

| Setting the elevation of the sun | Path in the ETS : **Suntracer KNX pro > Façades > Façade X: Automatic**

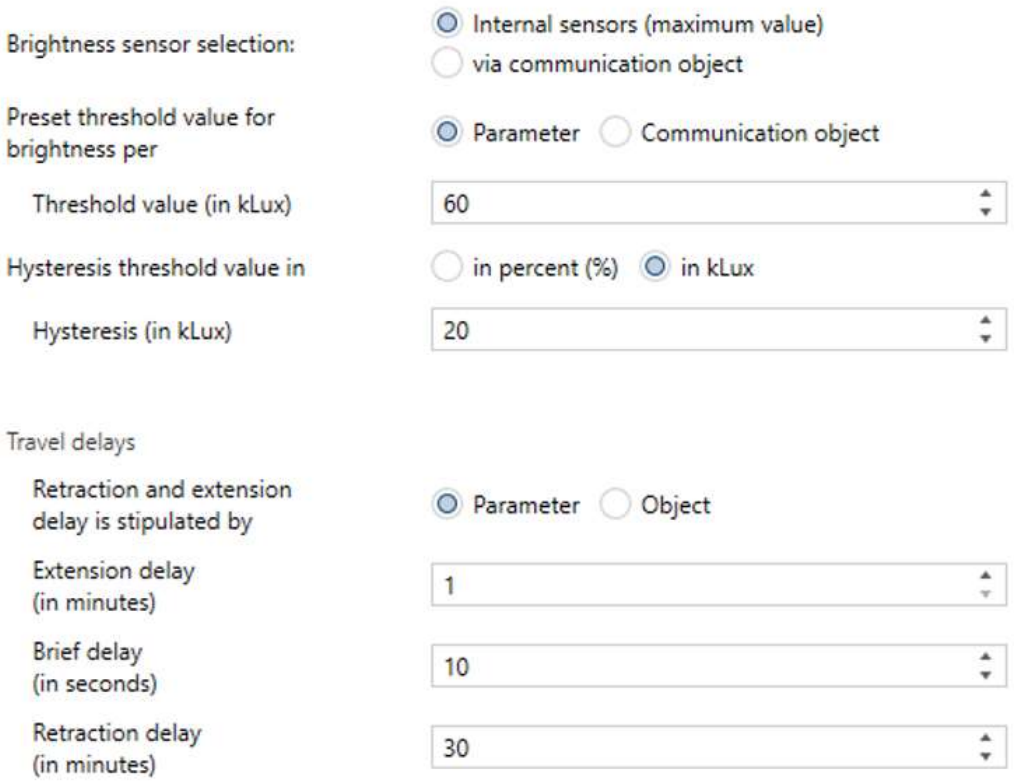


Sun protection automation

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

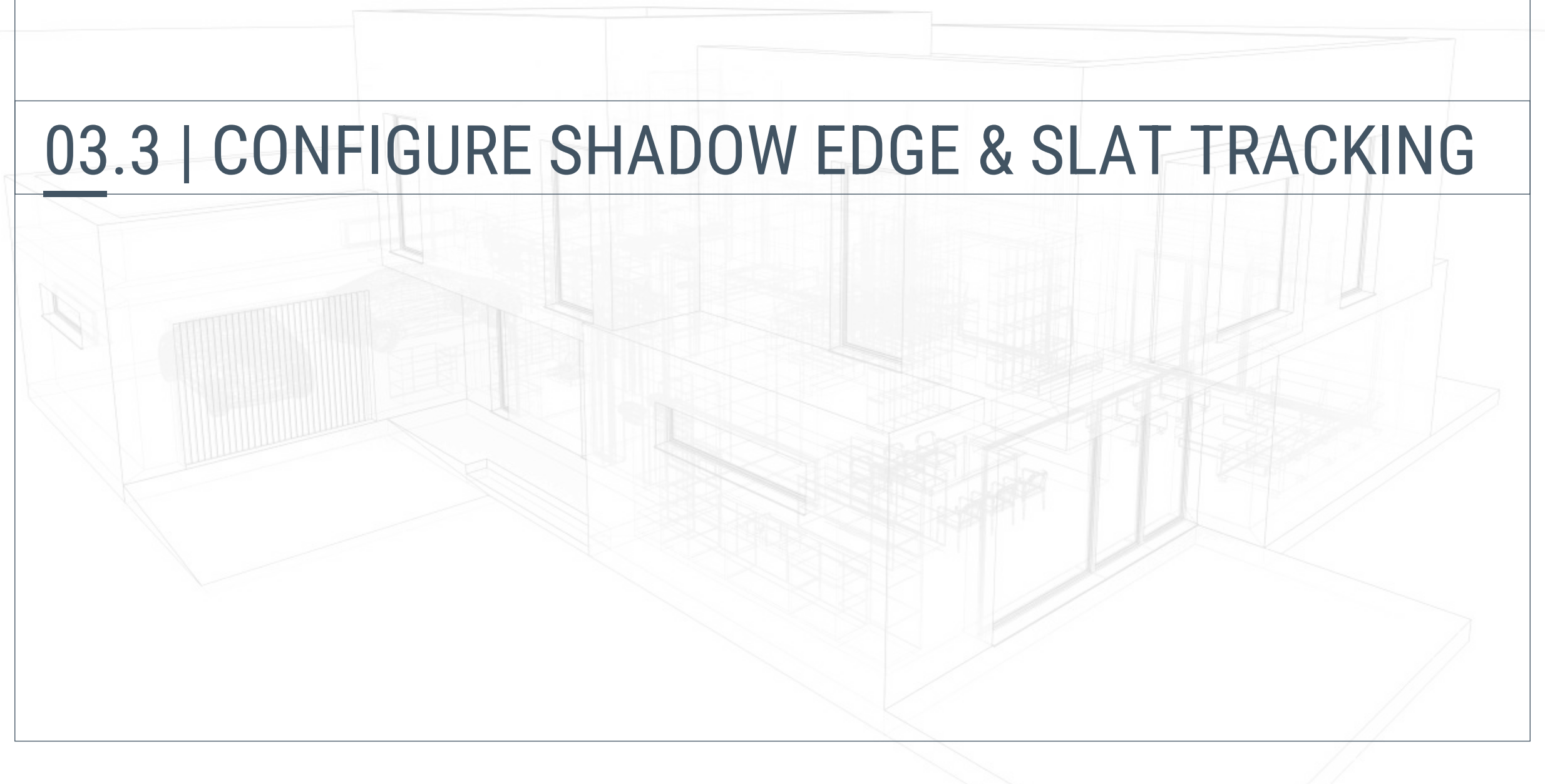
Brightness

| Path in the ETS : **Suntracer KNX pro > Façades > Façade X: Automatic**



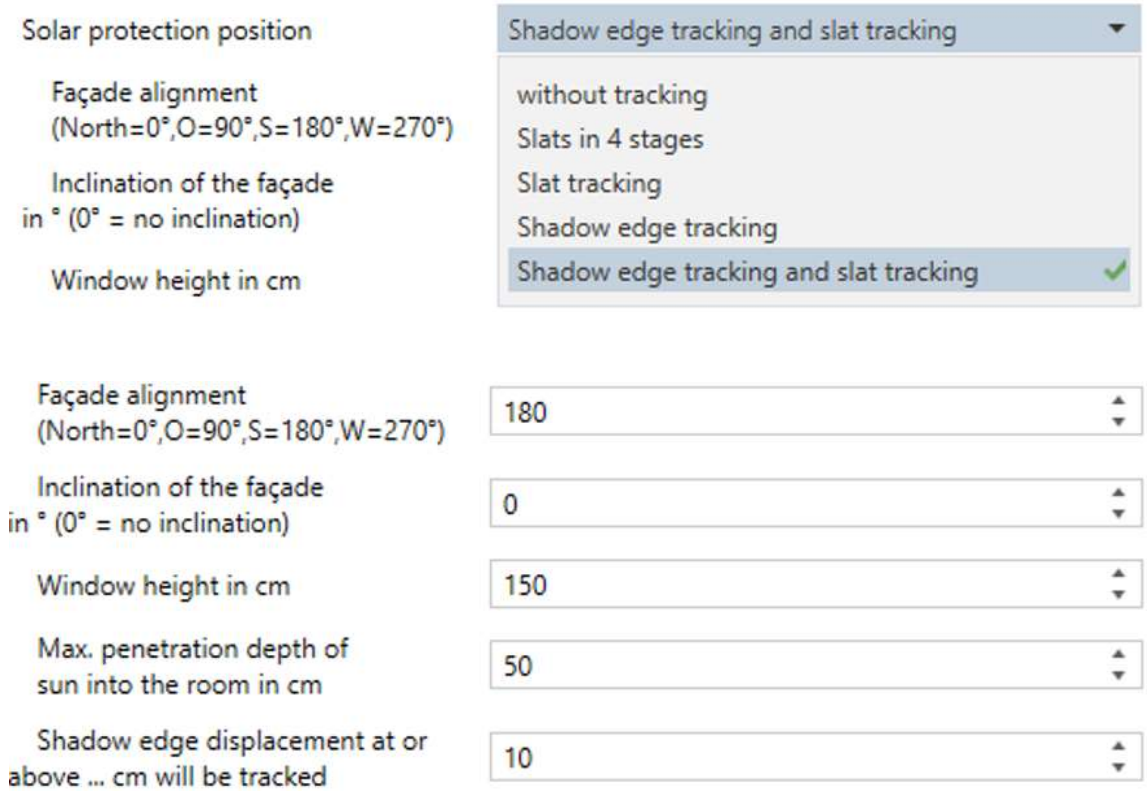
Do you still have questions about the automatic sun shading?

03.3 | CONFIGURE SHADOW EDGE & SLAT TRACKING



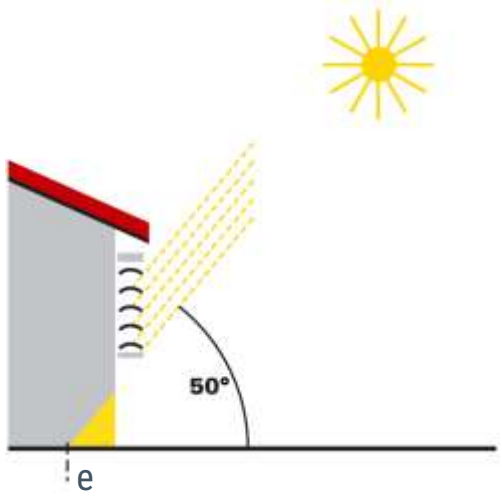
Shadow edge and slat tracking

| Path in the ETS : **Suntracer KNX pro > Façades > Façade X: Automatic**



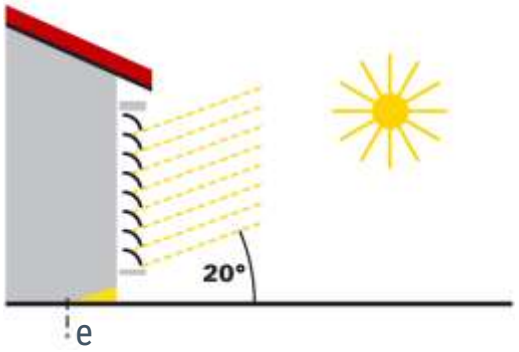
Shadow edge and slat tracking

| Path in the ETS : **Suntracer KNX pro > Façades > Façade X: Automatic**



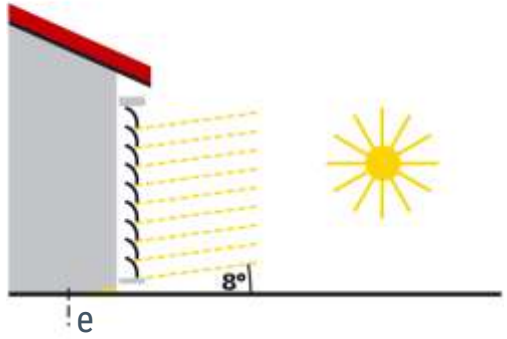
Sun protection when the sun is high

The sun shading is only partially closed and automatically lowered only far enough to prevent the sun from shining further into the room than the maximum permitted penetration depth (**e**).



Sun shading at medium sun position

The sun protection is automatically lowered only to the extent that the sun does not exceed the maximum permissible penetration depth into the room.



Sun protection when the sun is low

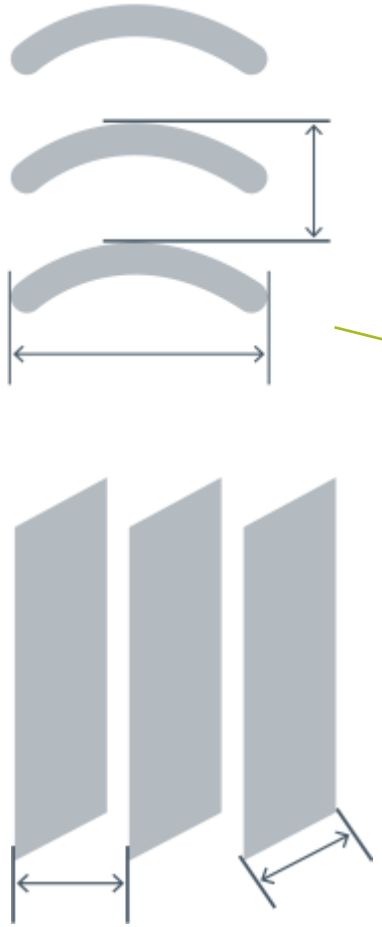
The sunshade is automatically lowered almost completely so that the sun does not shine too far into the room.

Do you still have questions about shadow edge and slat tracking?

03.4 | FINE ADJUSTMENTS FOR OPTIMUM SLAT POSITION

Determination of slat type, width and spacing

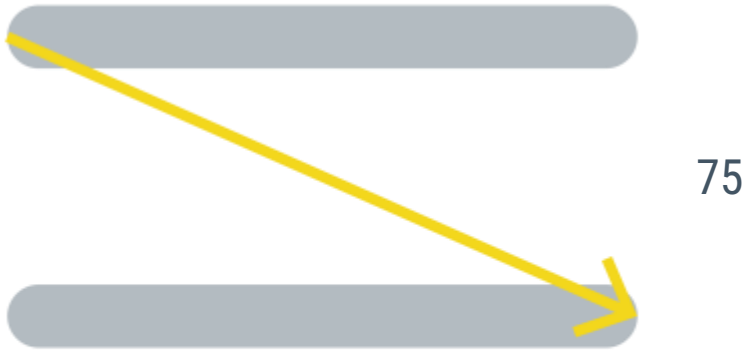
| Path in the ETS : **Suntracer KNX pro > Façades > Façade X: Automatic**



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

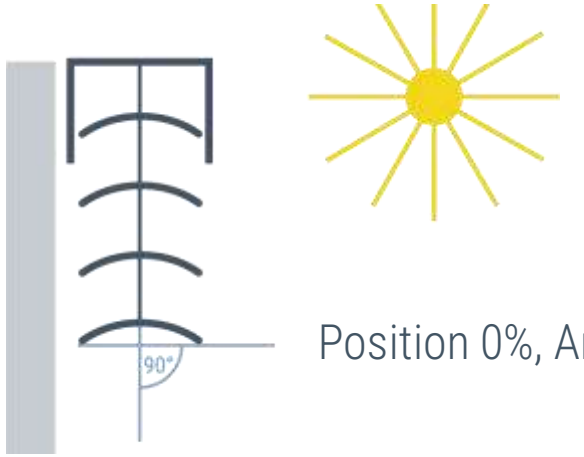
Influence of slat spacing on the slat position

| Different distance



Slat position with horizontal slats

| The possible angle at slat position 0% depends on the mechanism of the blind and the actuator.



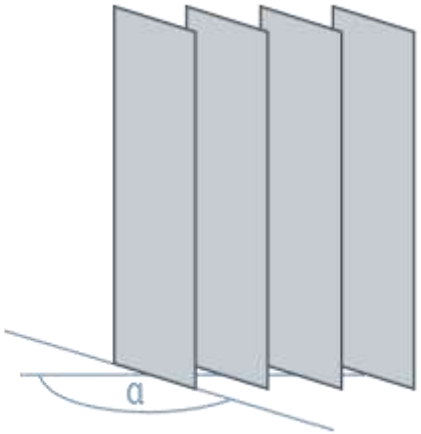
Position 0%, Angle 90°

Position 100%, Angle 160°

Position 100%, Angle 10°

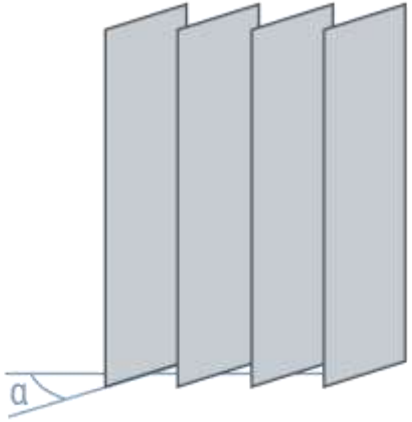
Slat position for vertical slats

| The possible angle at slat position 0% depends on the mechanism of the blind and the actuator.



Position 0%,
Angle 90°

Position 0%,
Angle 130°



Position 100%,
Angle 10°

Do you have any questions about the slat settings?

04 | CONFIGURATION PROTECTION FUNCTIONS

Protective functions

Basics for setting the wind threshold value

- Specification of the shade manufacturer
- Positioning/installation height of the shade
- Mounting position of the weather station

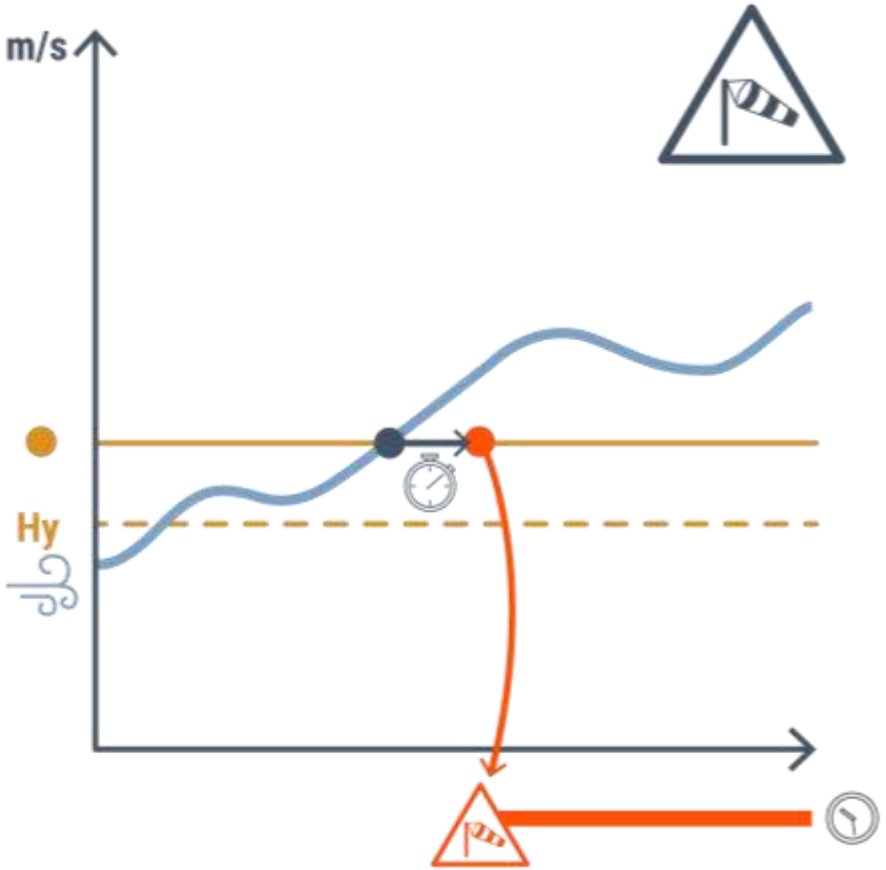
Protective functions

Overview of wind speeds

Description	km/h	m/s	Beaufort	Nodes
Calm	<1	< 0,3	0	<1
Light air	1-5	0,3-1,5	1	1-3
Light breeze	6-11	1,6-3,3	2	4-6
Gentle breeze	12-19	3,4-5,4	3	7-10
Moderate breeze	20-28	5,5-7,9	4	11-16
Fresh breeze	29-38	8,0-10,7	5	17-21
Strong breeze	39-49	10,8-13,8	6	22-27
Moderate gale	50-61	13,9-17,1	7	28-33
Fresh gale	62-74	17,2-20,7	8	34-40

Protective functions

How the wind threshold value works



- Blue line: Current wind speed
- Orange line: Set wind threshold value
- Orange dashed line: Hysteresis to avoid incorrect switching
- **Note:** The graphic illustrates the switching on and off of the alarm based on exceeding and falling below the threshold value - taking into account a delay time.

Setting wind direction threshold values

| Must be external

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

Not like that, please!

| Error case 1

– Problem: Exhaust air from the air conditioning system distorts temperature and wind measurement.

➢ **Solution:** Install out of reach of systems that cause air currents or waste heat!

Not like that, please!

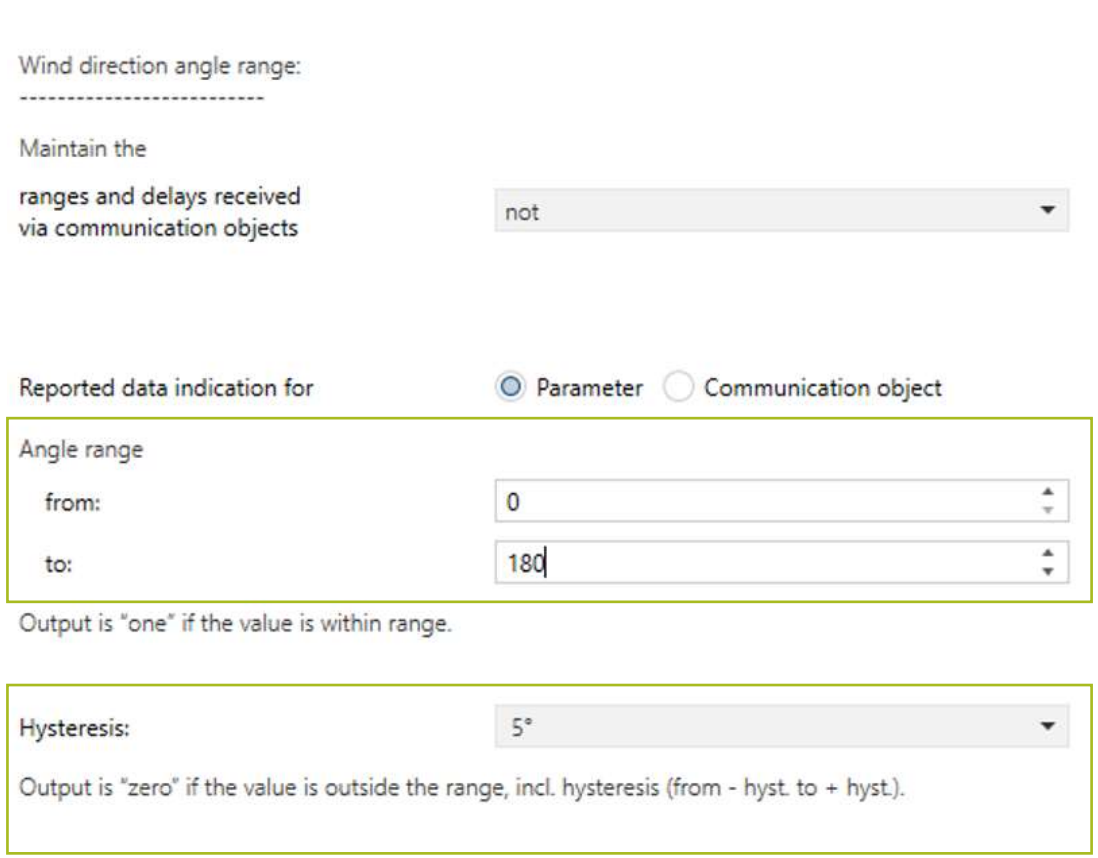
| Error case 2

– Problem: Impairment of brightness measurement due to self-mounted bird protection.

➢ **Solution:** Neither objects nor other structures may cast a shadow on the appliance!

Setting wind direction threshold values

| Path in the ETS: **Suntracer KNX pro > Wind direction range > Range X**



Wind threshold value

| Path in the ETS: **Suntracer KNX pro > Wind threshold value > 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

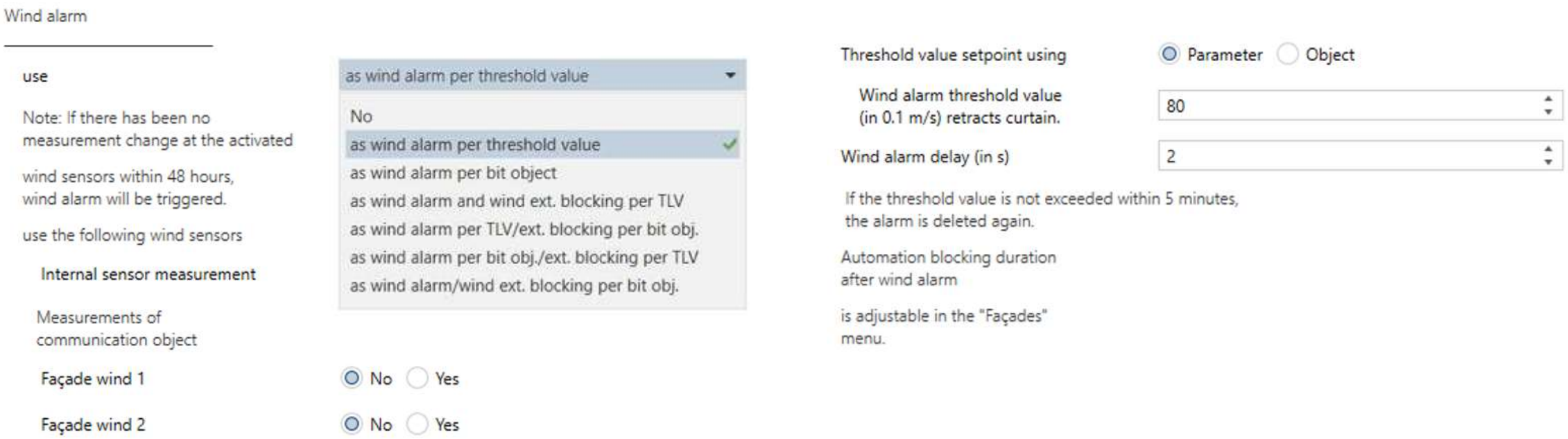
Action when locking: do not send telegram

Action when releasing (with 2 seconds release delay): Status object/s send/s

Wind threshold values in the façade control system

Setting in the façade and wind threshold value

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



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	-	

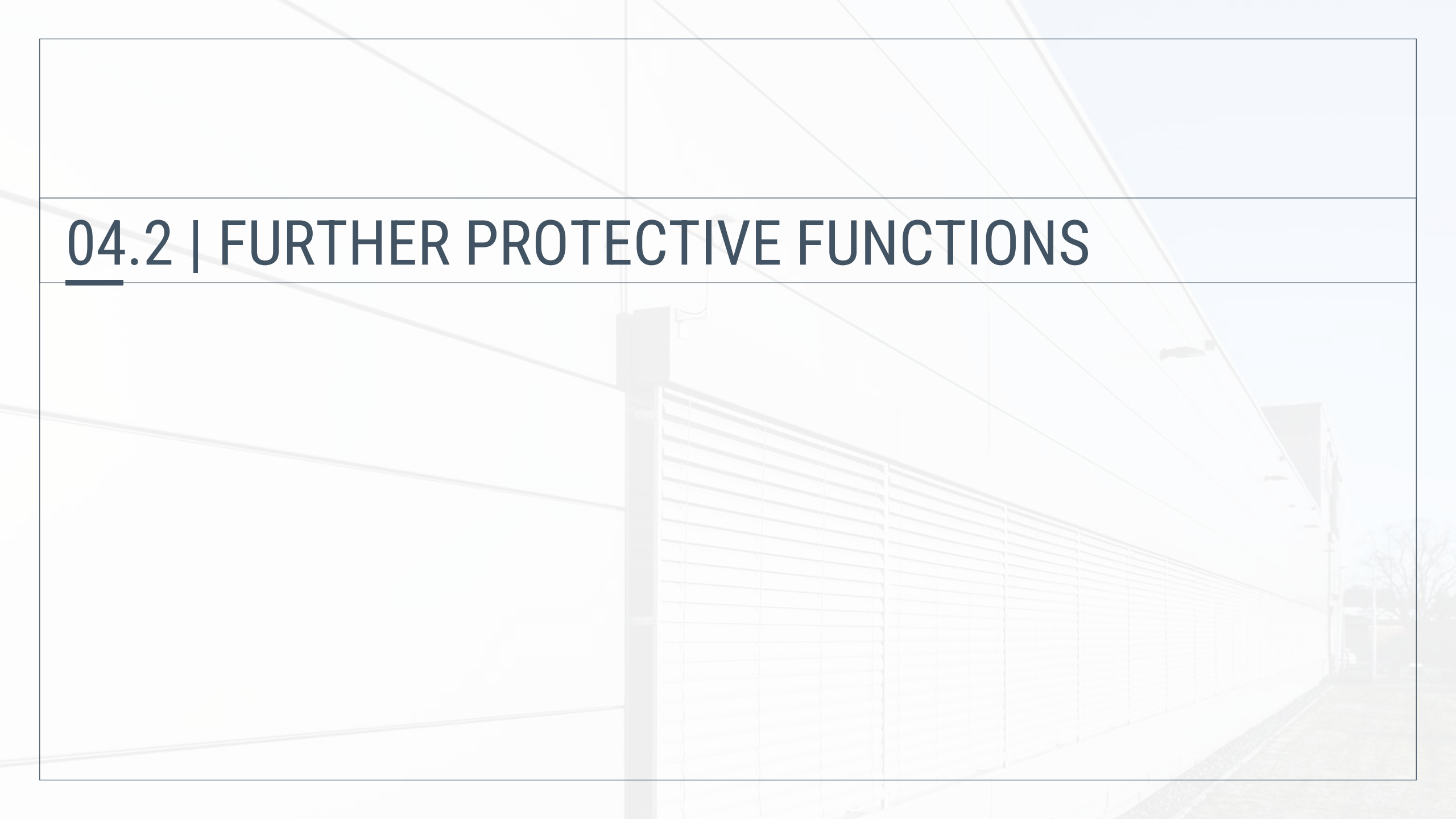
04.1 | CONFIGURE ADDITIONAL WIND SENSORS

Additional wind sensors

| KNX W (sl)

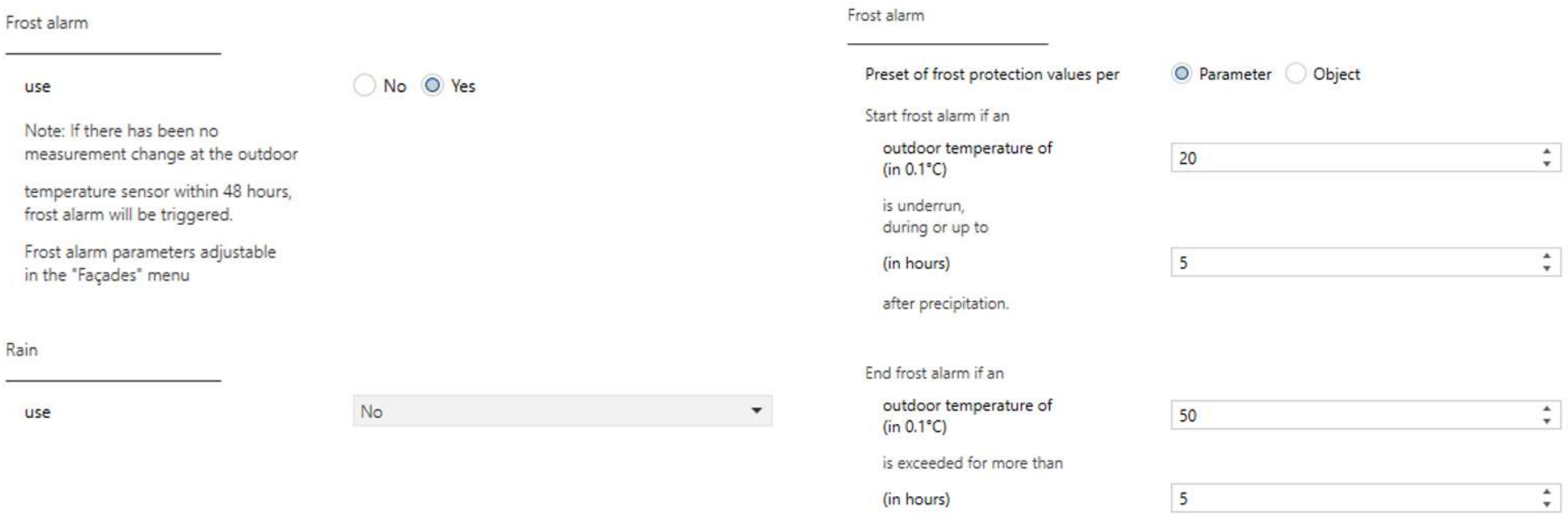
- Use of individual sensors for large façades
- The exact positioning of the wind sensors must be determined by the shutter manufacturer, planner or façade builder.
- Positioning of the wind sensors depends on numerous factors, including the type of shading and its structure
- In practice, it has been shown that a single sensor is placed approximately every three storeys for larger façades.

04.2 | FURTHER PROTECTIVE FUNCTIONS



Protecting the façade

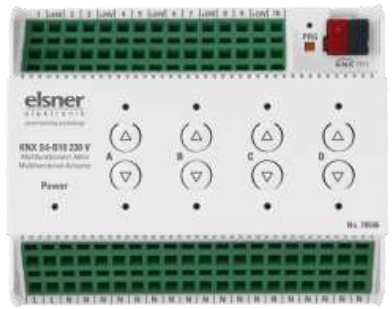
| Path in the ETS : **Suntracer KNX pro > Façades > Façade X: Function, safety**



Protective functions

| Live telegram monitoring

- Live telegram monitoring checks whether the KNX weather station regularly sends data (live telegrams) to the blind actuator.
- If these signals are missing, the actuator detects a failure and can, for example, raise the blinds automatically for safety reasons.



Do you have any questions about the protective functions?

05 | ENERGY SAVINGS THROUGH INTELLIGENT PARAMETERIZATION

KNX Pyranometer

| Detection of global radiation

- Measurement of global radiation (heat input through solar radiation)
- Recording the current irradiance in watts/m²
- Calculation of the energy input over time in kWh/m²
- Output of both values (W/m² and kWh/m²) by the device possible
- Precise energy demand estimates and overheating analyses are only possible by recording the heat input
- Necessary for comfort certificates according to DIN EN ISO 7730 or EN 16798-1

Pyranometer

| Parameters in Suntracer KNX Pro

Pyranometer

use	Yes
Façade pyranometer 1	No / Yes
Façade pyranometer 2	No / Yes
Façade pyranometer 3	No / Yes
Façade pyranometer 4	No / Yes
Threshold value (in W/m²)	500
Switching distance (hysteresis) threshold value in	in percent (%) / in watts/m²
Threshold value switching distance (hysteresis) (in W/m²)	400
Movement position for pyranometer	
Movement position (in %)	100
Retraction delay in minutes	5
Analysis of the pyranometer release object	1 = activated | 0 = deactivated / 0 = activated | 1 = deactivated
Value up to 1st communication	0 / 1

638	Facade Pyranometer measured value 1 in W/m²	Input	2 bytes	C	-	W	T	-	power de...	Low
639	Facade Pyranometer measured value 1 in W/m²	Input	4 bytes	C	-	W	T	-	amplitude	Low
640	Facade Pyranometer measured value 2 in W/m²	Input	2 bytes	C	-	W	T	-	power de...	Low
641	Facade Pyranometer measured value 2 in W/m²	Input	4 bytes	C	-	W	T	-	amplitude	Low
642	Facade Pyranometer measured value 3 in W/m²	Input	2 bytes	C	-	W	T	-	power de...	Low
643	Facade Pyranometer measured value 3 in W/m²	Input	4 bytes	C	-	W	T	-	amplitude	Low
644	Facade Pyranometer measured value 4 in W/m²	Input	2 bytes	C	-	W	T	-	power de...	Low
645	Facade Pyranometer measured value 4 in W/m²	Input	4 bytes	C	-	W	T	-	amplitude	Low

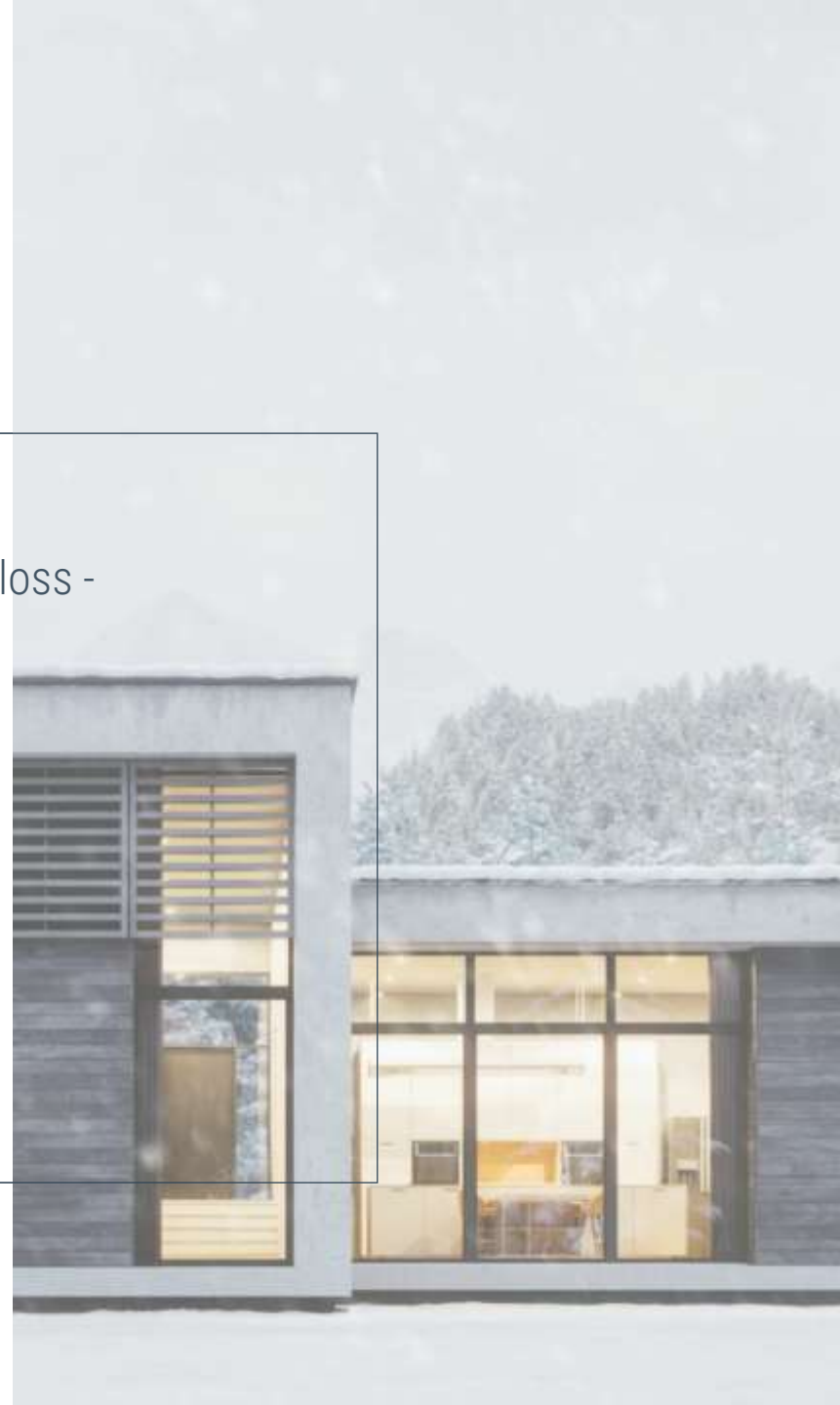
Outdoor temperature block for ventilation

| Temperature threshold value

Automated ventilation is only enabled automatically when the outside temperature is appropriate. This helps to prevent the building from cooling down in cold temperatures.

Implementation is possible via a temperature threshold value that blocks the ventilation.

Advantage: Reduced heat loss - heating costs are lowered.



Do you still have questions about saving energy through intelligent parameterization?

06 | INSTALLATION AND TROUBLESHOOTING

Façades Status output

| Path in the ETS: **Suntracer KNX pro > Façades > Façades**

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	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

Simulation objects

| Automatic simulation via communication objects

- Simulate weather data (e.g. brightness, wind, rain, temperature) for system testing without real weather conditions
- Manual specification of sensor values possible
- Ideal for commissioning, testing & troubleshooting
- Activation via communication objects in the ETS

Do you still have questions about Installation and troubleshooting?

07 | INTEGRATION OF FURTHER FACADES

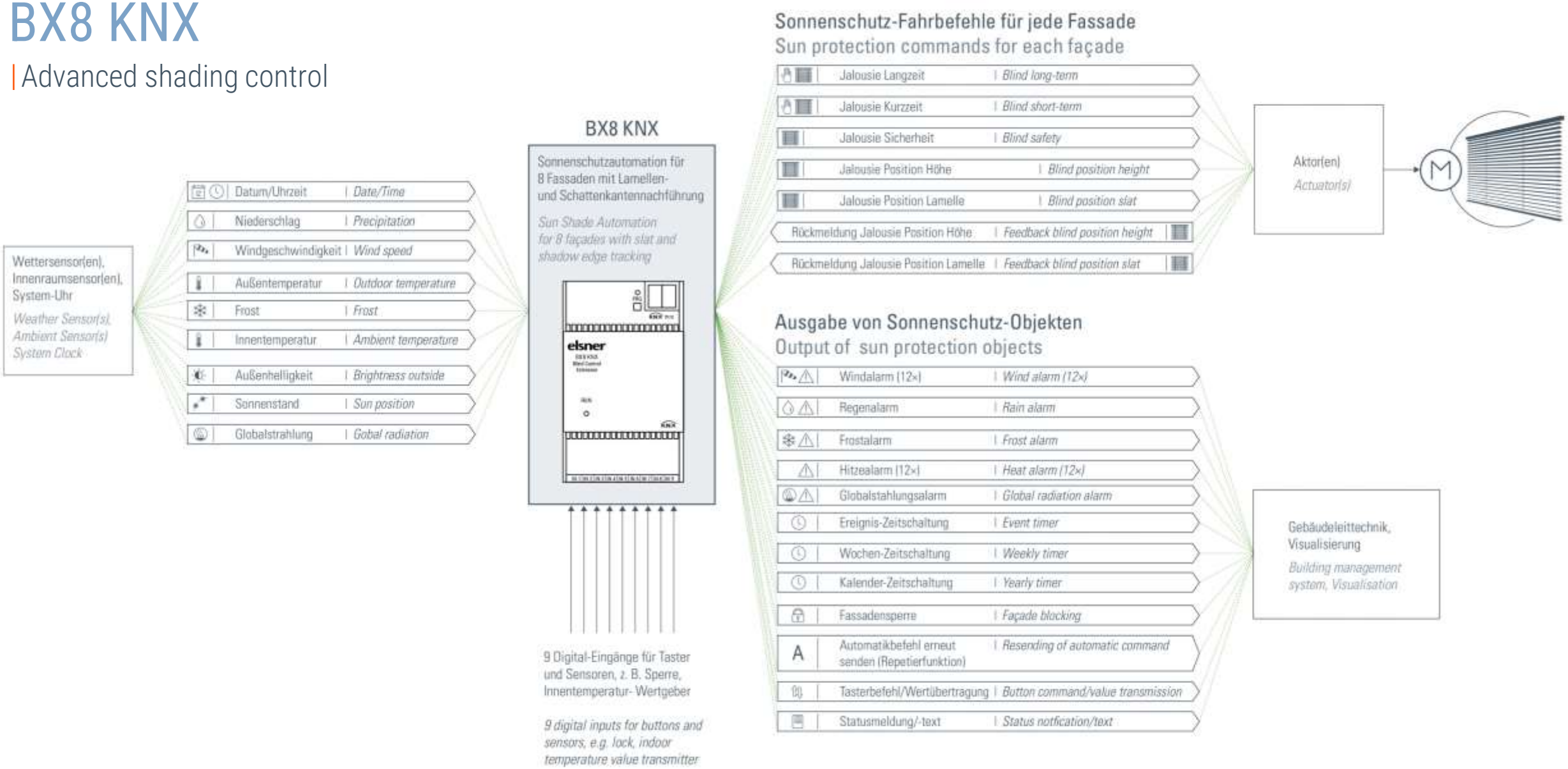
Extension for more façades

| BX8 KNX with transducer

- P04-KNX-GPS or other KNX weather station possible as measured value transmitter
- Extension with 8 façades for large buildings
- Shading incl. slat and shadow edge tracking
- Rain, wind and frost protection
- Timers

BX8 KNX

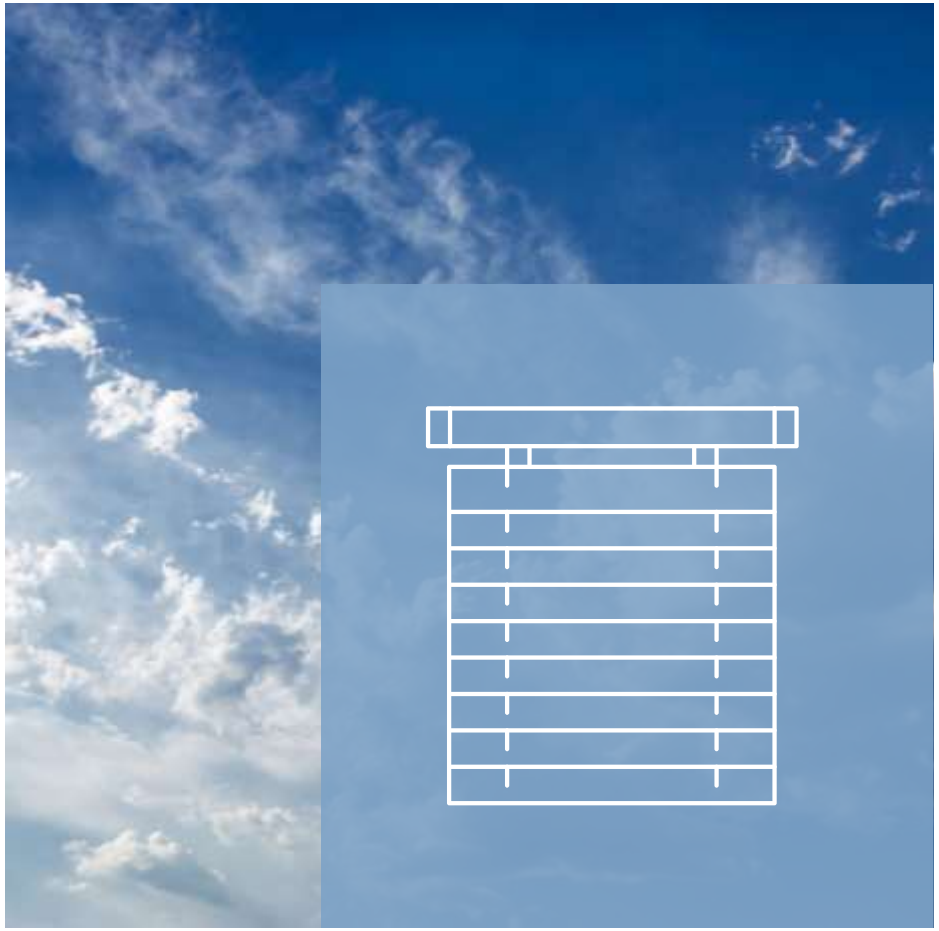
| Advanced shading control



Repetition

| Topics covered

1. Model comparison and function overview
2. Functions and special features of Suntracer KNX Pro
3. Parameterization of the façade automation
4. Configuration of protective functions
5. Energy saving through intelligent parameterization
6. Commissioning and troubleshooting
7. Integration of additional façades



WISHES, SUGGESTIONS & FEEDBACK

Further webinars and recordings
can be found here

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