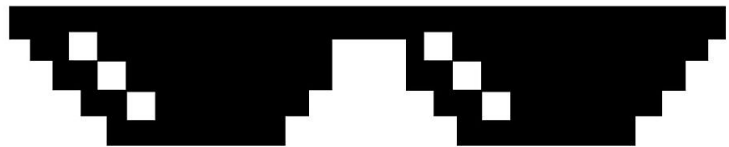


PRESENTS



Keep your Cool!

Exterior Passive House Motorized Shading and Controls

LOXONE



475 HIGH
PERFORMANCE
BUILDING SUPPLY

Why Exterior Shading?

Control/comfort/discomfort

- View
- Glare
- Light
- Privacy
- Reflection
- Heat



The sun moves!
It's dynamic
Active vs. passive



Why not interior shading?

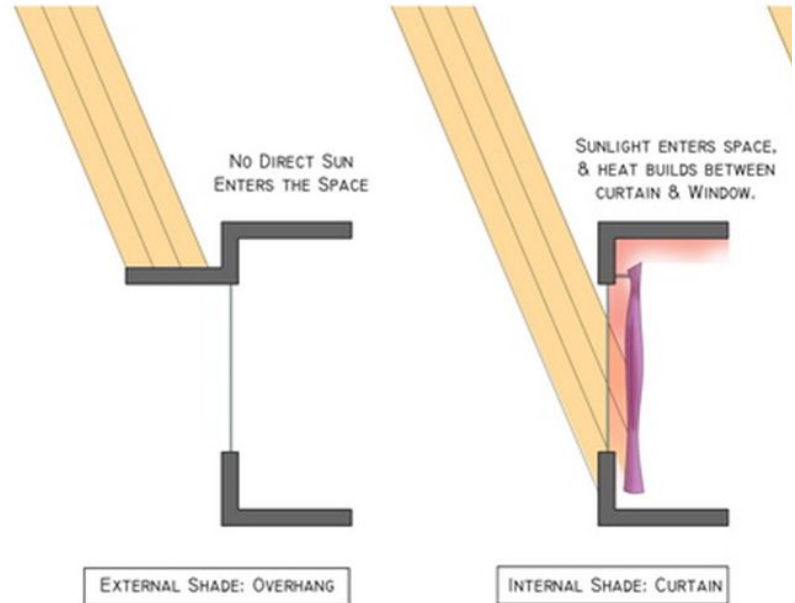
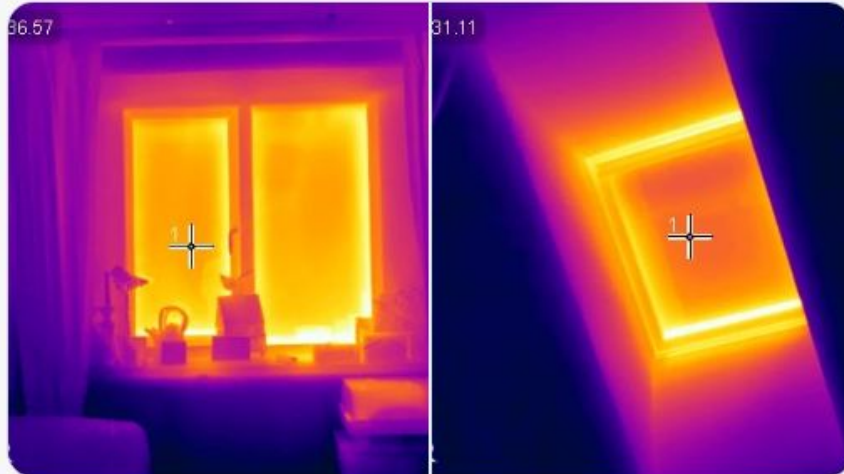
Interior does not work

- Heat is already in the building
- Glazing is generally coated to lock heat gains in the building



Nick Grant @ecomiminalnick · Aug 11

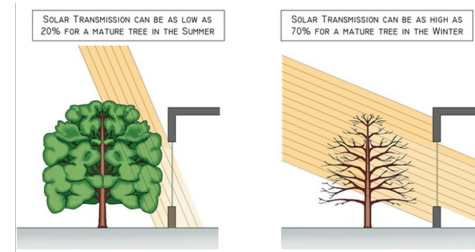
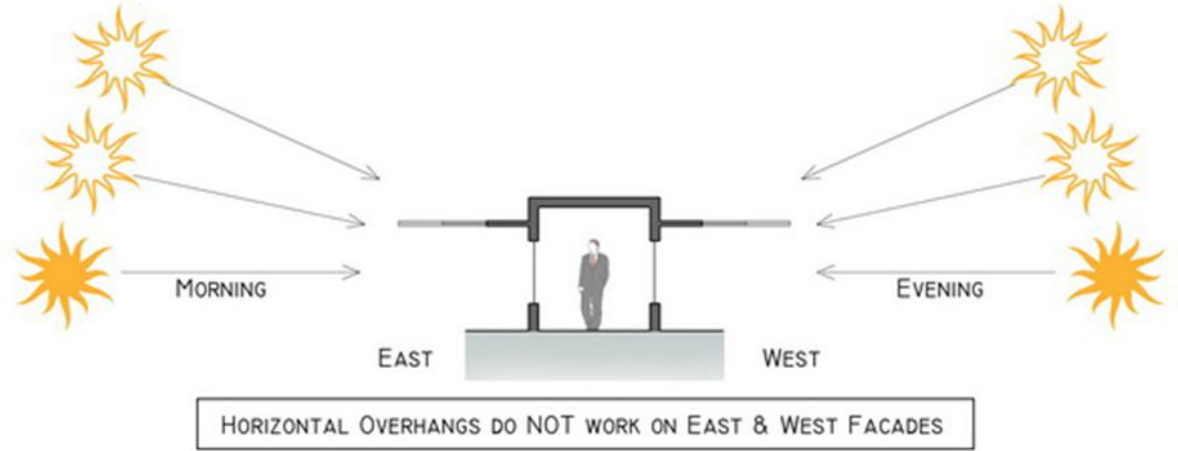
Summer comfort isn't just about air temperature. Radiant discomfort is a thing. Move away from the hot glass, internal blinds won't help much as the blinds will probably be a similar temperature.



Applications?

Not just a Passive House Thing!

- Benefits are universally applicable
- Can be found on all building types in a variety of climate zones: Office, schools, housing
- Critical in a Passive House with high contribution of solar heat gain for winter, low sun angles (east and west in particular), cooling dominated climates



PHPP Temporary Sun Protection

Exterior shades provide factor 10x improvement over interior shades!

In reality, shades are not typically used all the time. The PHPP therefore automatically accounts for:

- Manual controls: PHPP assumes reduction of 70% of solar heat gains during cooling period.
- Automated controls: PHPP assumes reduction of 80% of solar heat gains during cooling period.
- For the calculation of the potential for overheating, the PHPP assumes reduction of 90% of solar heat gains during the cooling period.

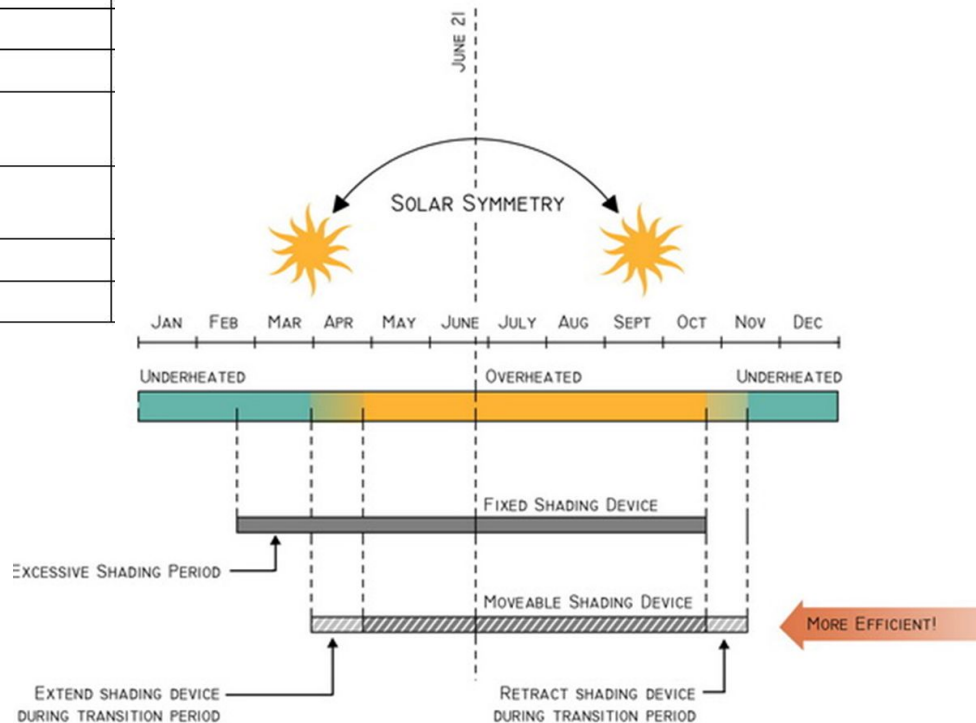
	Triple Pane Glazing		Double Pane Glazing	
Location of shading	Exterior	Interior	Exterior	Interior
Slats, shades vertical	0.06	0.70	0.07	0.60
Fabric shade, white	0.24	0.60	0.25	0.50
Fabric shade, grey	0.12	0.80	0.14	0.75
Foil	-	0.60	-	0.50

Reduction of the g-value per table (PHPP 10 Manual) based on DIN V 18599-2, and/ or DIN EN 13363

Code Challenge

CLIMATE ZONE	FENESTRATION U-FACTOR ^f	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC ^{d, e}
0	0.50	0.75	0.25
1	0.50	0.75	0.25
2	0.40	0.65	0.25
3	0.30	0.55	0.25
4 except Marine	0.30	0.55	0.40
5 and Marine 4	0.30	0.55	NR
6	0.30	0.55	NR
7 and 8	0.30	0.55	NR

Max SHGC values vs. motorized shades



Code Challenge

Max SHGC values vs. motorized shades

4 mixed heating season > cooling season

and 3C and 3A/B (it is complicated)

Climates Heating driven 5-8

3A and 3B	$4500 < \text{CDD}_{50^\circ\text{F}} \leq 6300$ AND $\text{HDD}_{65^\circ\text{F}} \leq 5400$
4A and 4B	$\text{CDD}_{50^\circ\text{F}} \leq 4500$ AND $\text{HDD}_{65^\circ\text{F}} \leq 5400$
3C	$\text{HDD}_{65^\circ\text{F}} \leq 3600$
4C	$3600 < \text{HDD}_{65^\circ\text{F}} \leq 5400$

In all climates cooling should be avoided -
passively first!

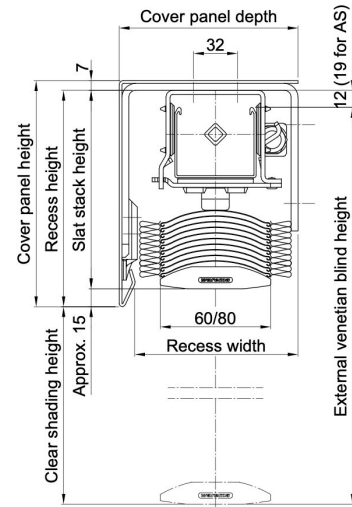
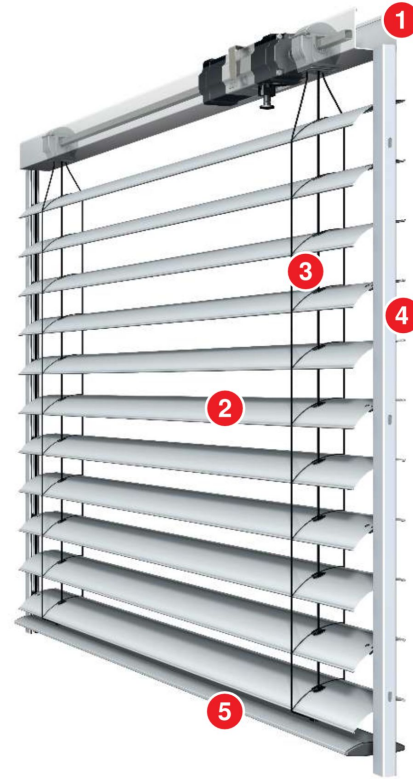
Stretch the “shoulder” season



System Components

The Motorized Shade

- Typ. Aluminum slats
- Various widths and profiles
- Line-voltage motors
- Various track and cable-guided options
- Exterior, recessed, or integrated mounting
- Generally about a dozen standard colors and access to entire RAL color system
- Considerations: Looks, wind resistance, shading factor



- | | | | |
|---|------------------------------|---|------------------|
| 1 | Top rail (tilt rod, bearing) | 4 | Lateral guidance |
| 2 | Slats | 5 | Bottom rail |
| 3 | Tilting tape, lifting tape | | |

Coverage, Slats and Wind Resistance

Simple slats: None, or not rated

Folded slats: Up to 80 kph (by manf.)

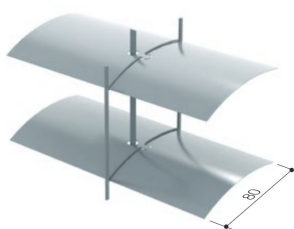
Rated in accordance to DIN EN 13659

Slat widths typ. 63 to 93mm, or 2-½" to 3-⅝"

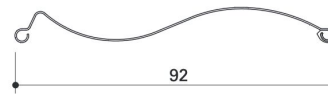
Typ. up to 6m or 20' tall

Typ. up to 20m² or 215 sf coverage

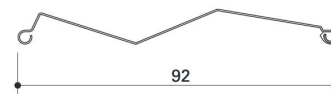
Maximum coverage area and heights, as well as "**slat stack heights**" set by system selected.



**The original S-shaped slat,
only available from HELLA:**
elegant soft wave profile

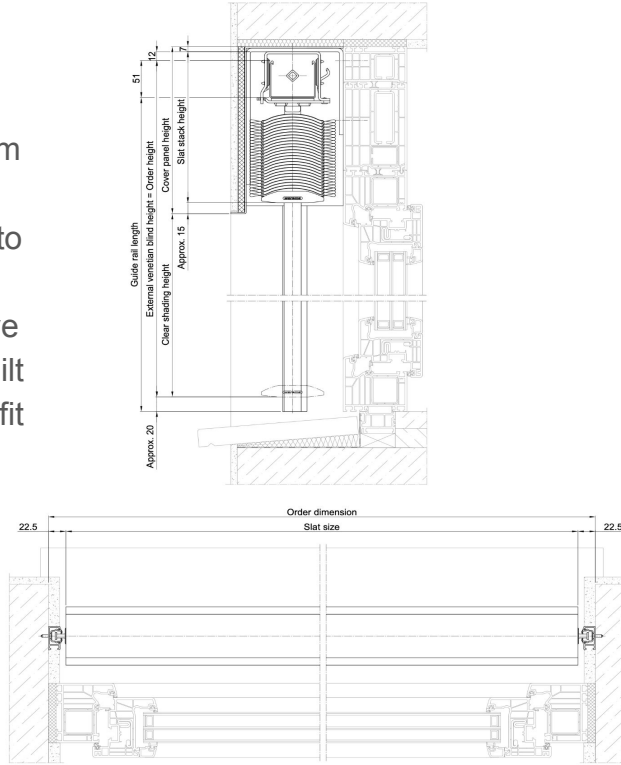


The Z-shaped slat:
modern-geometric shape



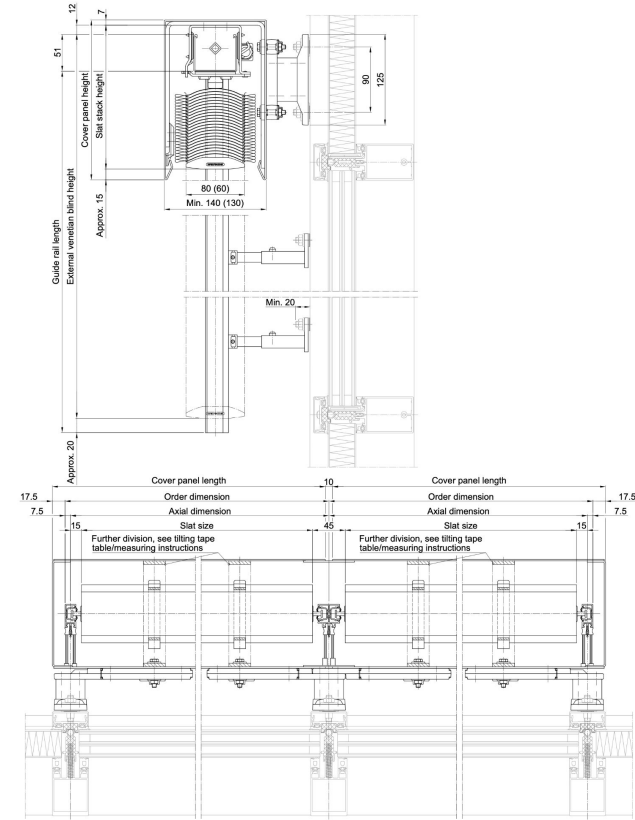
The Shade Box

- Houses the shade mechanism when retracted
- Can be integrated, or bolted to the face of the building
- Can be invisible, or decorative
- Can be purchased, or site built
- Needs to be sized exactly to fit the shade and window dimensions = requires integrated planning



The greyed-out sections of the illustration represent interfaces to general trades which, on the whole, must be planned and performed independently and on-site. WAREMA does not provide services for the greyed-out interfaces and assumes no liability for them.

Integrated



The greyed-out sections of the illustration represent interfaces to general trades which, on the whole, must be planned and performed independently and on-site. WAREMA does not provide services for the greyed-out interfaces and assumes no liability for them.

Exterior

Images: Warema

New Construction and Retrofit

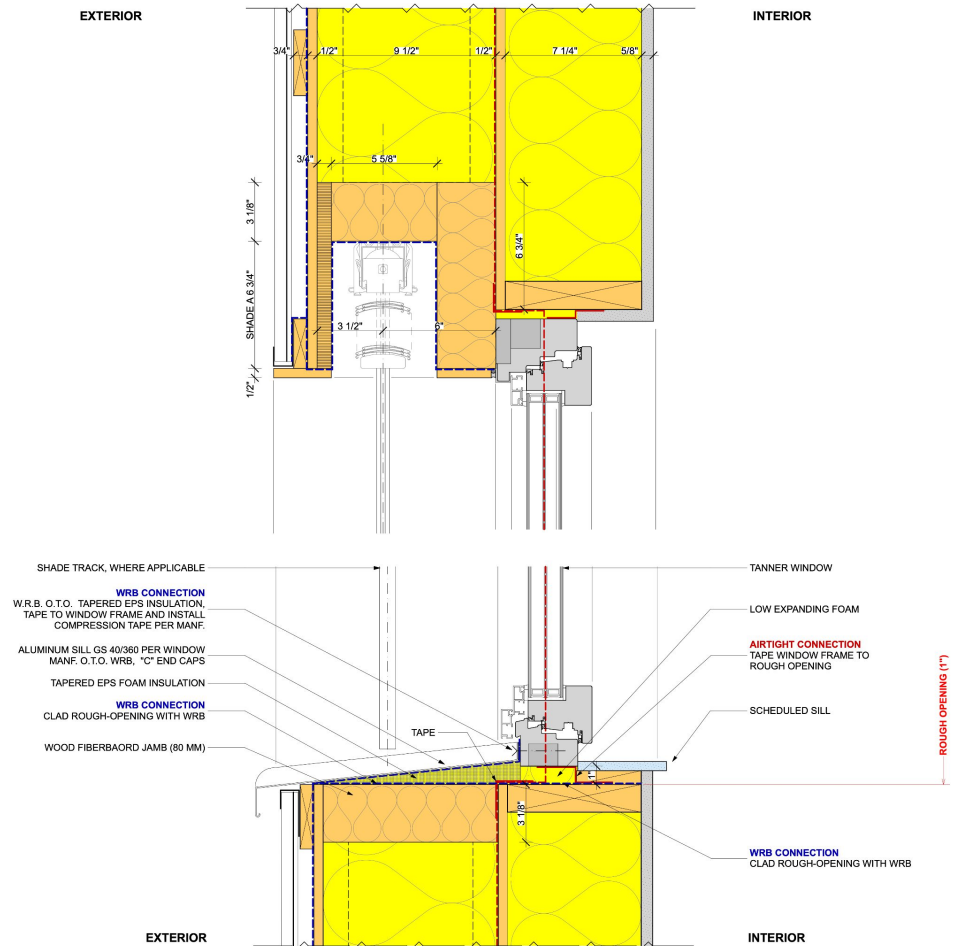
- Integration more likely in new construction or significant exterior retrofit like EnerPHit
- Exterior application more likely for existing buildings or retrofits to the interior
- Hardwired, or wireless (but needs line voltage power)

Integrated Shade Box



Integrated Design

- Detailing is key for aesthetics, performance and durability
- Close collaboration with window and shade vendor
- Detailed architectural and shop drawings











Exterior Shade Box



The Actuator

- Controls the movements of the motorized shade
- Can be wireless, or wired
- Can be as simple as an up-down switch, more convenient like a remote control, and as sophisticated as a smart, and/or automated control system



Automation

- Can do more than up, or down
- Can be preventative rather than chasing heat
- Timer controls
- Enhance daylighting
- etc.



Protection

- Wind Protection
- Frost Protection



Automatic Blinds : A Must for Passive Cooling & Heating



**Shading
that thinks for
itself**



Shading - Then and Now

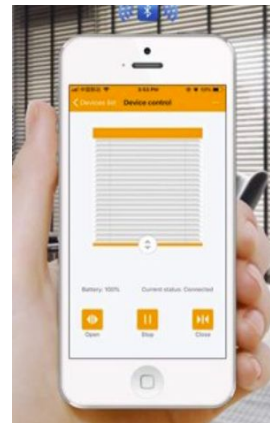
Then:

- Manually operated
- Must be inside and protected
- No intelligence
- Protrusion of the airtight layer



Modern Building - “Smart Control”

- Shading controlled with wall switches
- Complex control through remotes and apps, always manually controlled



... and Today - Intelligent Operation



LOXONE

& Automation

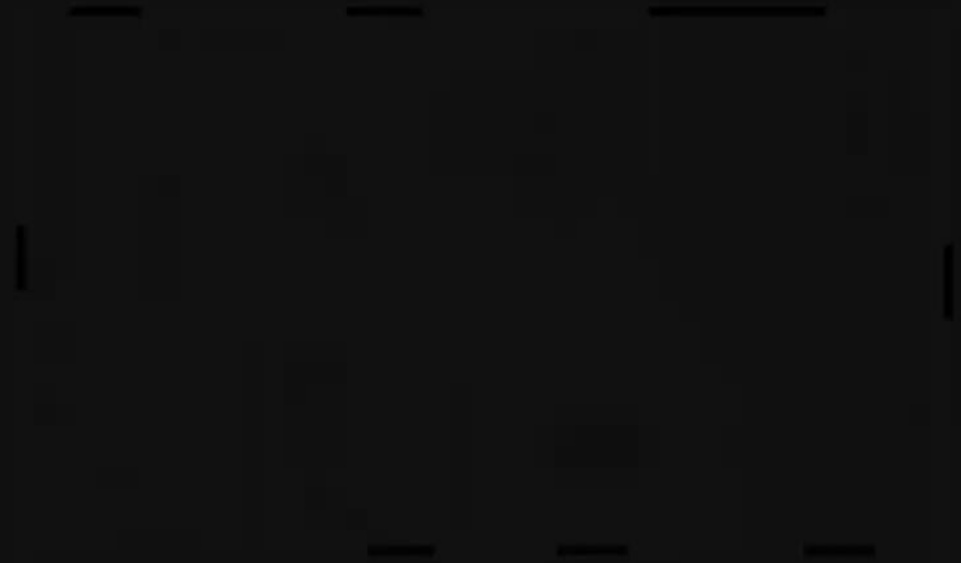


20°C 11°C



20°C 11°C





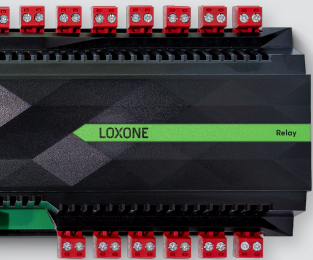
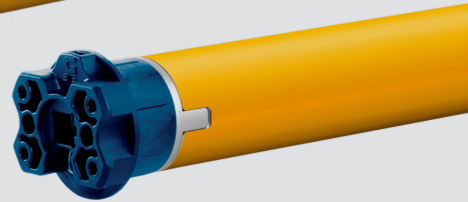
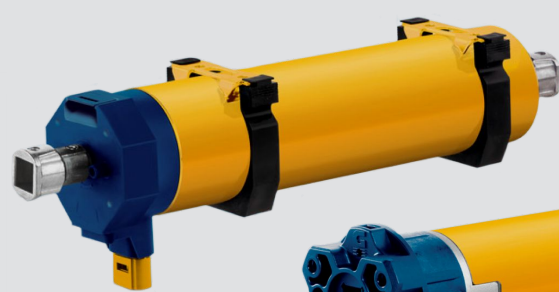
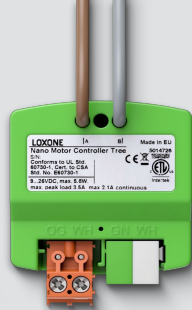
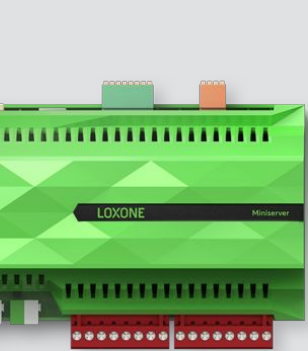
Loxone shading automation:

Why?

What is needed?

How does it work?





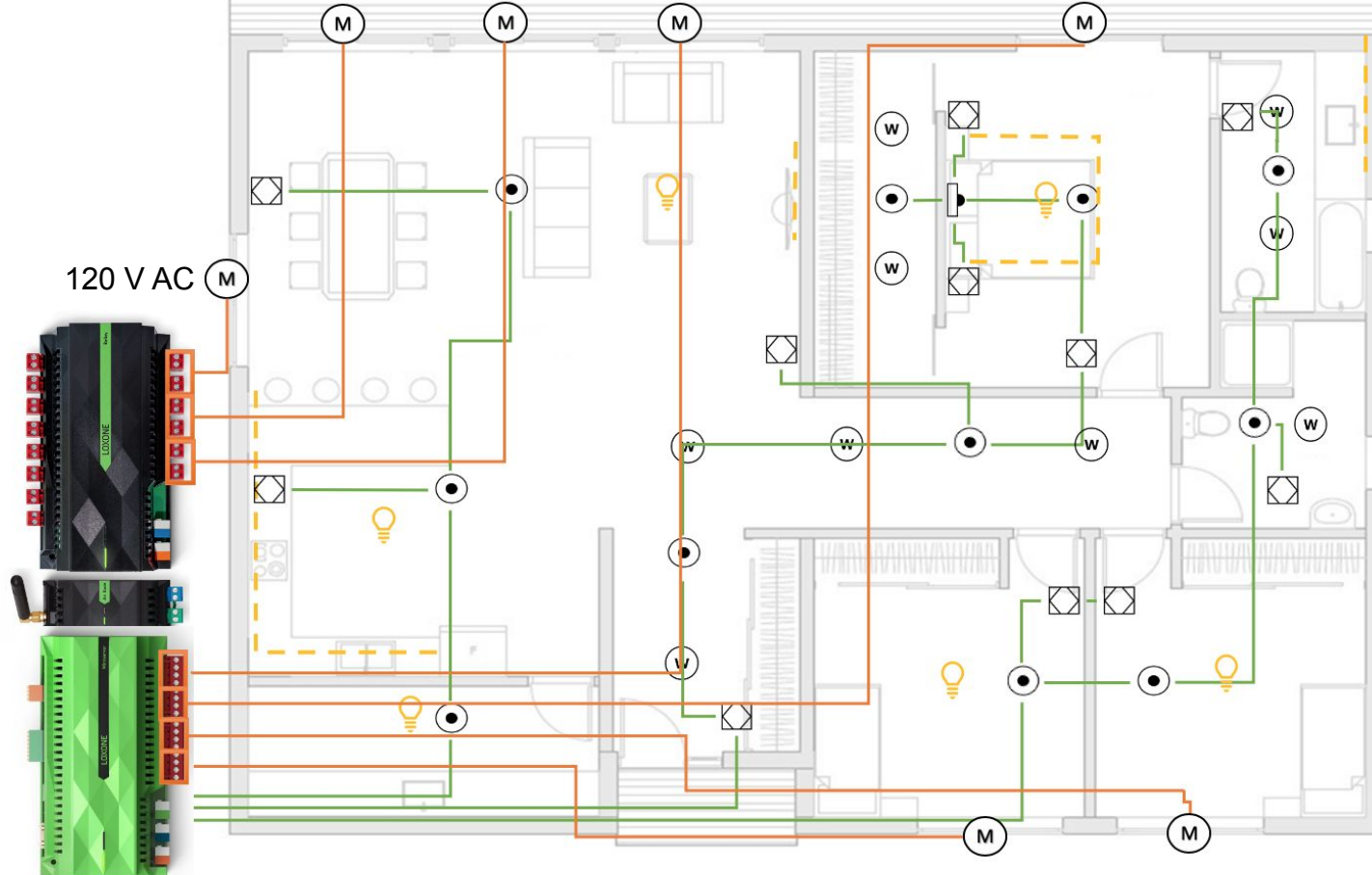
Products for intelligent shading



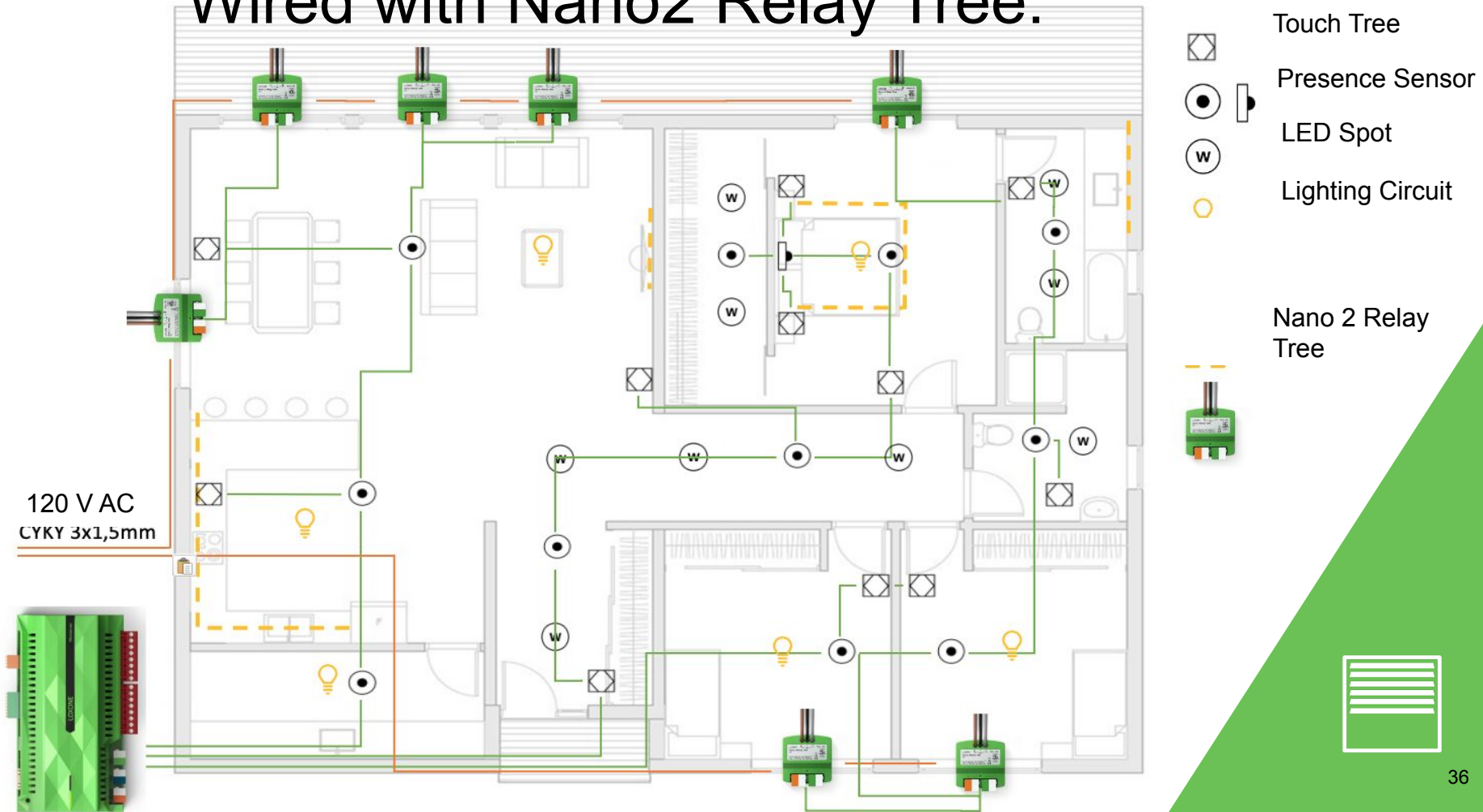
Multiple wiring options:



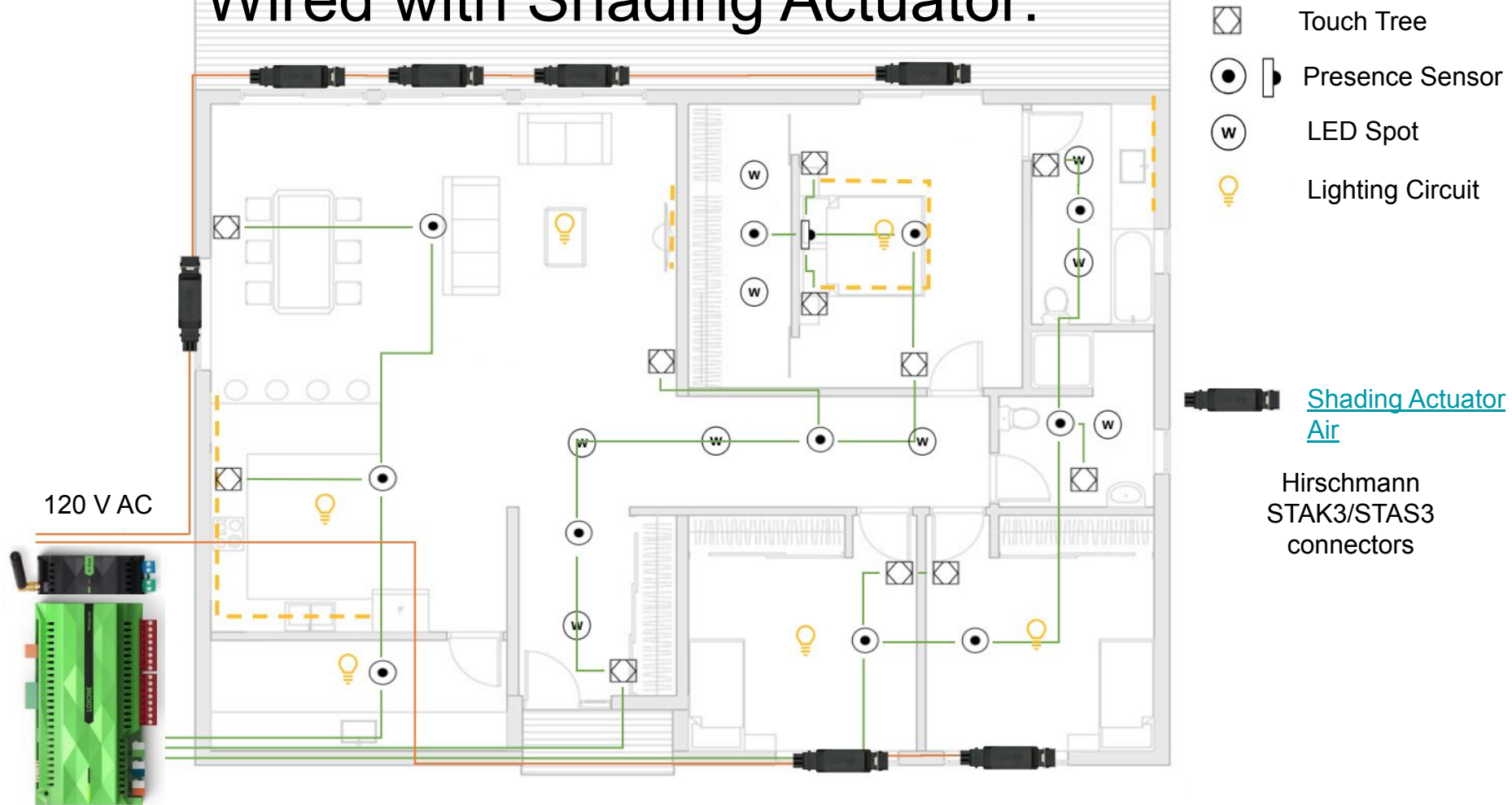
Centrally wired blinds to relays:



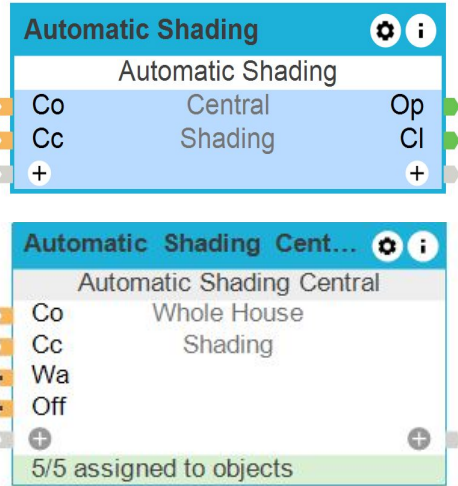
Wired with Nano2 Relay Tree:



Wired with Shading Actuator:



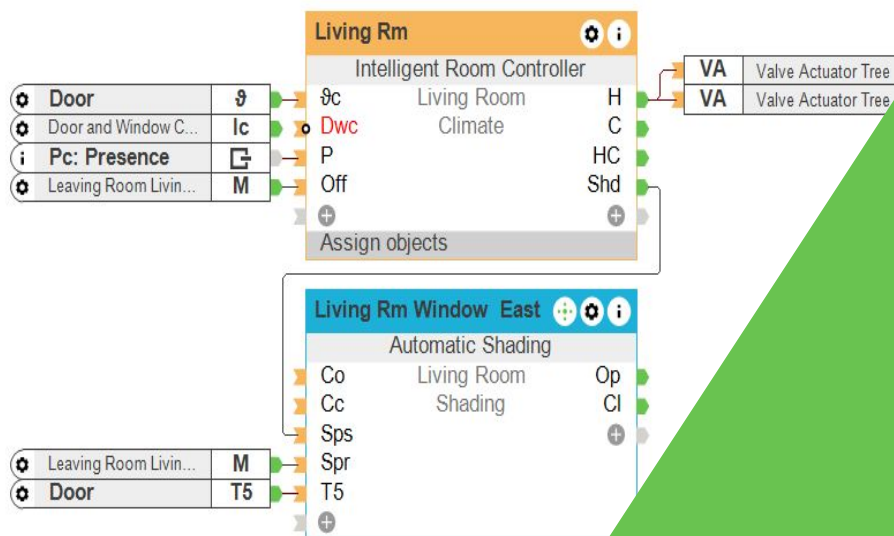
Loxone Config:



- Pre designed block for shading
- Automatically visualised in the app
- Can work with different shading types
- Can integrate with the heating function blocks
- Storm and Frost protection automatically for all blinds
- Built in logic for intelligent shading
- + more, see the: [Documentation](#)



Automatic Blinds Inputs



T5 - Loxone Touch

Sps - Automatic Shading
(Connected to Heating)

Dwc - Door/Window Contact

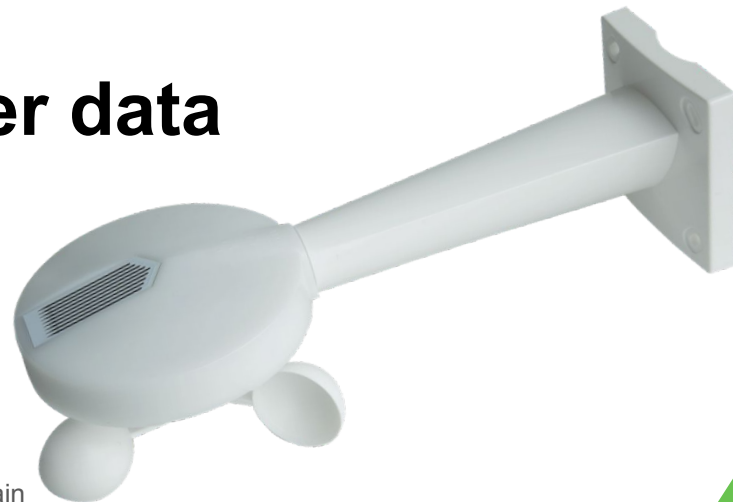
Co / Cc - Complete Open/Closed

Slat - Slats to a specific position

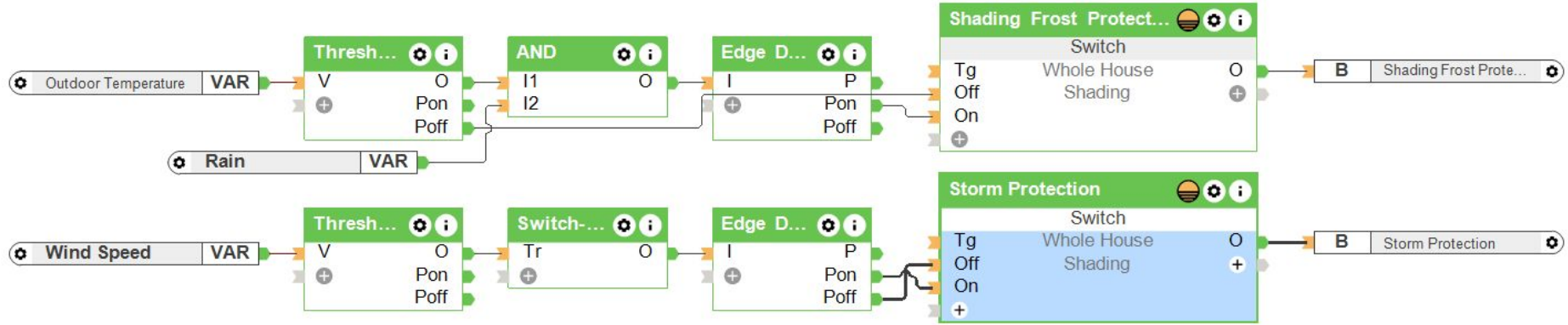
Extra functionality with weather data

Weather Station Air / Tree

- Storm Protection - Information from weather service
- Frost Protection - Combine low temperature reading with rain
- Sensors Included:
 - Wind, Brightness (lux), Temperature, Rain



Loxone Auto-Config Automatic Wind and Frost Protection:



Technical parameters of the shading technology that affect the correct function:

Window orientation

Room temperature

Outdoor radiation

Times (drive up/down, tilt time, pre-excitation, ...)

Type of shading technology (blinds, blinds, awnings, ...)

Environmental influences (building corners, vegetation, ...)

The distance between the slats and their width (blinds)

Room type (sleeping vs. living)

Season (winter vs. summer operation)

Alarm (burglary, fire, ...)

Open window to the terrace

...

Automatic Shading Parameters.

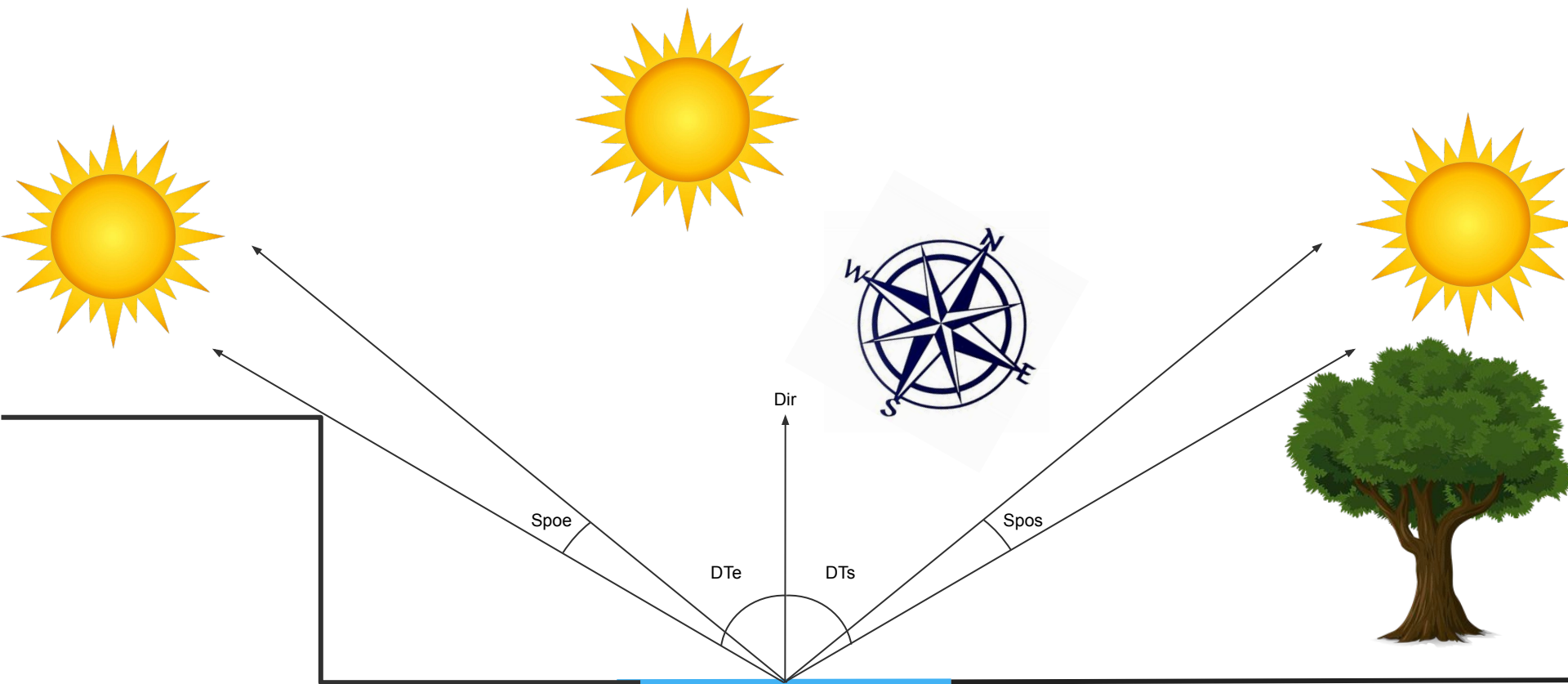
Default Value	
Type - Shading type	0
Wap - Wind alarm position [...]	
Spe - Sun position automatic en...	1
Tlc - Time long-click [s]	3
Opd - Opening duration [s]	75
Cld - Closing duration [s]	70
Mld - Motor lock duration [s]	0.5
Tdc - Time double-click [s]	0.3
Rd - Return duration [s]	0.8
Blldo - Backlash duration opposit...	0.15
Bld - Backlash duration [s]	0
minTd - Minimum travel duratio...	0.4
Dir - Compass direction [°]	0
Dts - Direction tolerance start [°]	85
Dte - Direction tolerance end [°]	85
Sw - Slat width [mm]	70
Sd - Slat distance [mm]	60
Spm - Sun position automatic m...	1
Spi - Sun position automatic inte...	120
Spos - Sun position automatic st...	30
Spoe - Sun position automatic e...	-30

(T) - Type of Shading

(Opd / Cld) - Travel Time Up/Down

(Dir) - Compass Orientation

(Sw / Sd) - Slatted Blinds
Measurements (With these
measurements the blinds can be angled
to prevent direct sunlight)



ϑ_{ec} temperature eco
cooling

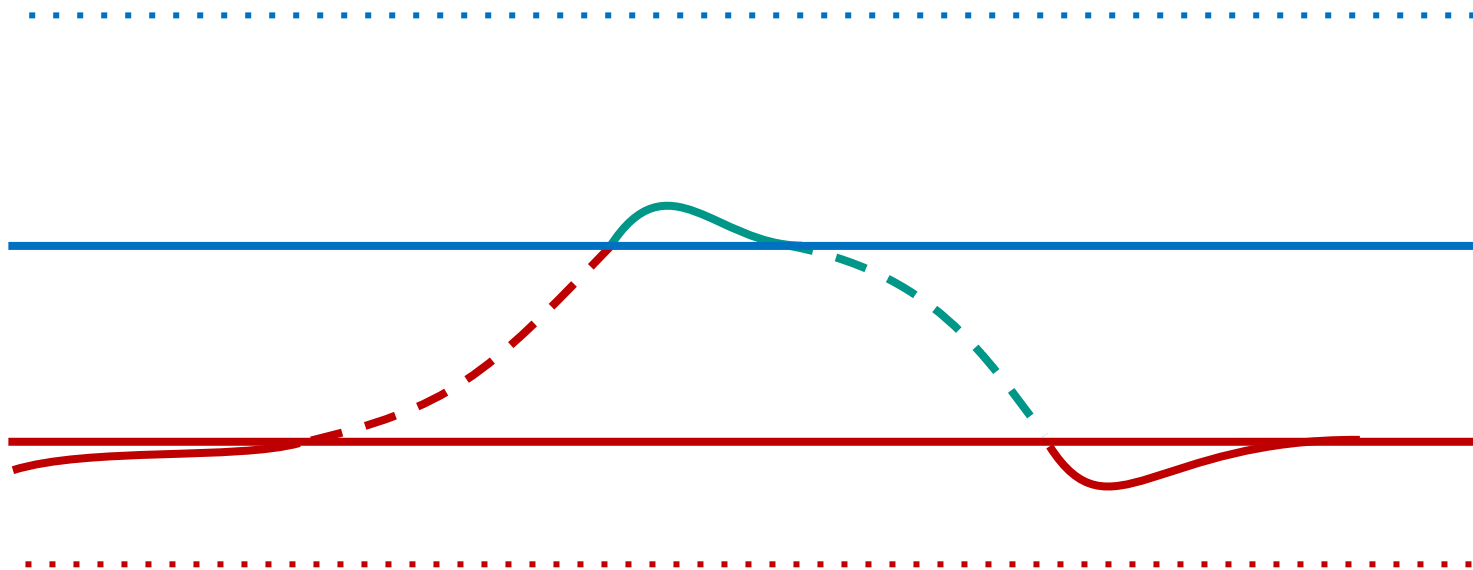
ϑ_{sh} temperature
shading heating

ϑ_{cc} comfort temperature
cooling

ϑ_{sc} temperature
shading cooling

ϑ_{ch} comfort temperature
heating

ϑ_{eh} temperature eco
heating



Active heating / cooling

Passive heating /
cooling

More than just protection from the sun



Overheat
Protection



Security



Frost Protection



Flexible Grouping



Privacy



Storm Protection



Casual Cleaning



Professional Cleaning



Thank You & Questions

475 High Performance Building Supply: <https://foursevenfive.com>

Loxone Smart Controls: <https://www.loxone.com/enus/>

TE Studio Passive House Design: <https://www.testudio.com/>

The Loxone logo consists of the word "LOXONE" in a bold, green, sans-serif typeface.The logo for 475 High Performance Building Supply features the numbers "475" in a large, blue, stylized font. To the right of the numbers, the words "HIGH PERFORMANCE BUILDING SUPPLY" are stacked in a smaller, blue, sans-serif font.