futurasmus
KNX GROUP

CONSTANT LIGHTING REGULATION

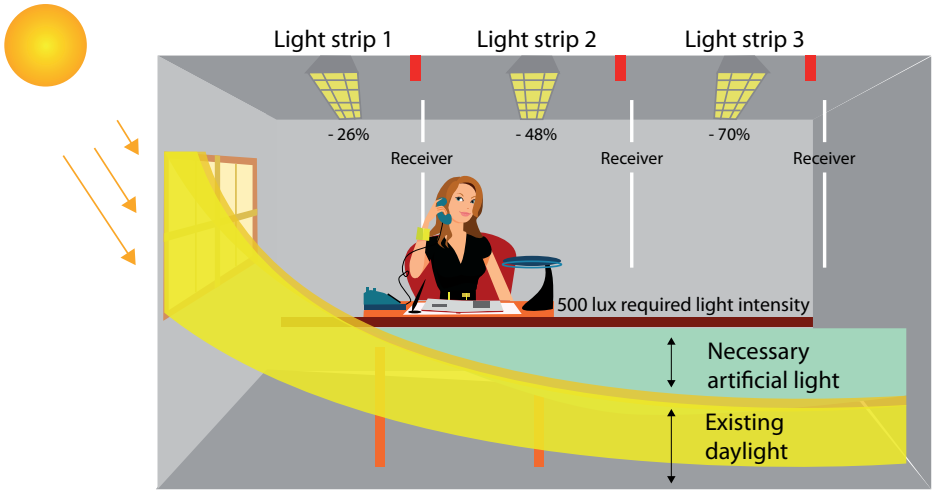
KNX®

Constant Lighting Regulation (CLR)

In an advanced KNX System you do not only switch and dim lights manually, but also continuously and progressively adjust the required level of brightness in the room (or at the desk, for instance) depending on the external light. This is what we call Constant Lighting Regulation and you can achieve maximum comfort and save energy.

Learn here how to select and configure the right KNX components.

There are a couple of important things one should take into account when realizing a constant lighting regulation.



Notes about saving energy with CLR:

- Lighting: only the necessary amount of lighting used. Remember that KNX dimming actuators do save energy (opposite to conventional ones).

- Cooling: by reducing the artificial brightness, less heat is generated and thus less cooling energy is needed (1 kW lighting energy needs 3 kW of cooling energy to compensate the heat generated by the lights !!!)

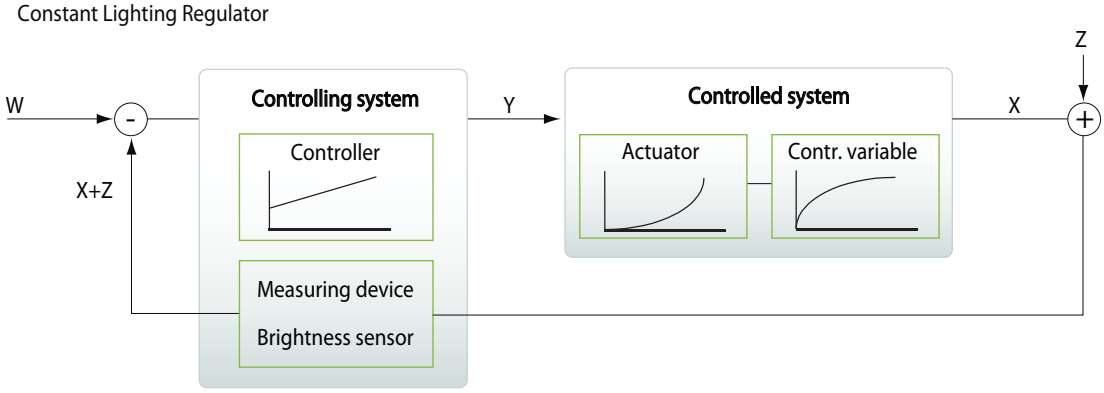
Constant Lighting Regulation (CLR)

1 Components

a. KNX dimming actuator – All (no special features needed).

b. KNX pushbuttons – All (recommended with display).

c. Constant Lighting Regulator

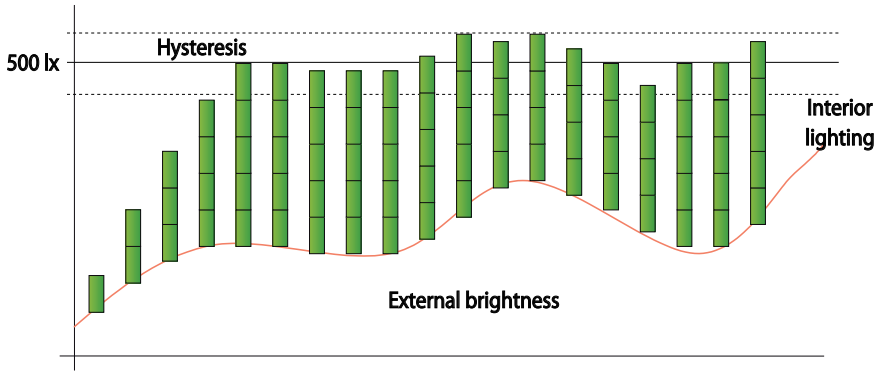


W ... Reference variable (e.g. brightness, setpoint)
Y ... Control value (dimming value 1-100%)
Z ... Interference (level of external light)
X ... Actual value (lux value at workstation)

c.i. 2 Main types:

Closed loop regulation
Sends an continuous absolute value - 8bits - (I-Regulation Algorithm) to the bus depending on the difference between actual and set point value.

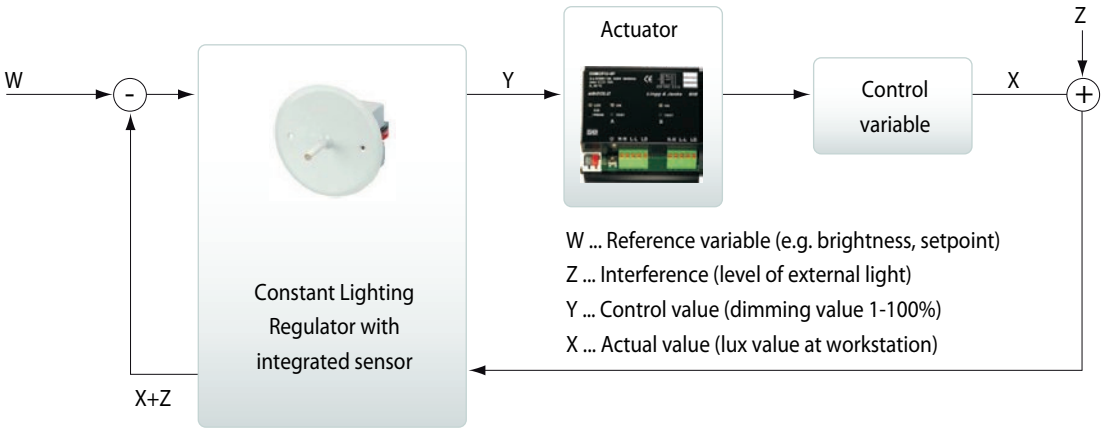
Integral reset
Increments or decrements with always the same step size (4bits – relative dimming or 8bits – absolute dim value) until it reaches the configured hysteresis zone (symmetrically around the set point) Attention! The hysteresis zone has to be bigger than the step size, otherwise it will oscillate.

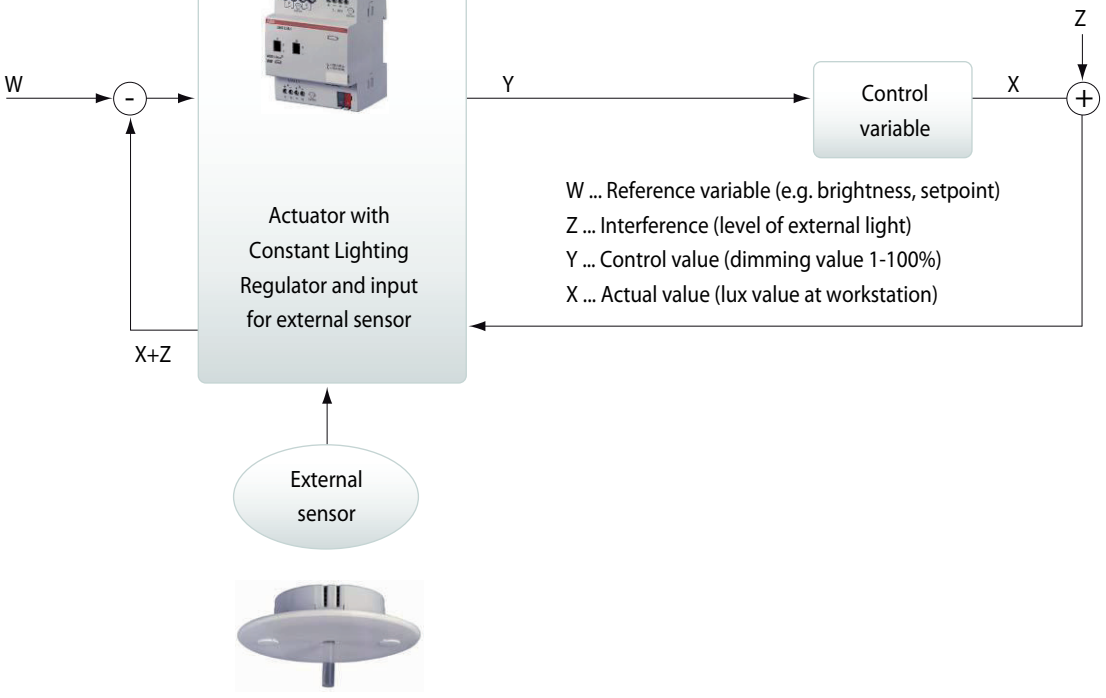


c.ii. The brightness sensors that are used for CLR should have a measured-value resolution not more than 15% of the set point value. Ex. set point = 600 lux; tolerance < 90 lux.

Constant Lighting Regulation (CLR)

2 Different component topologies





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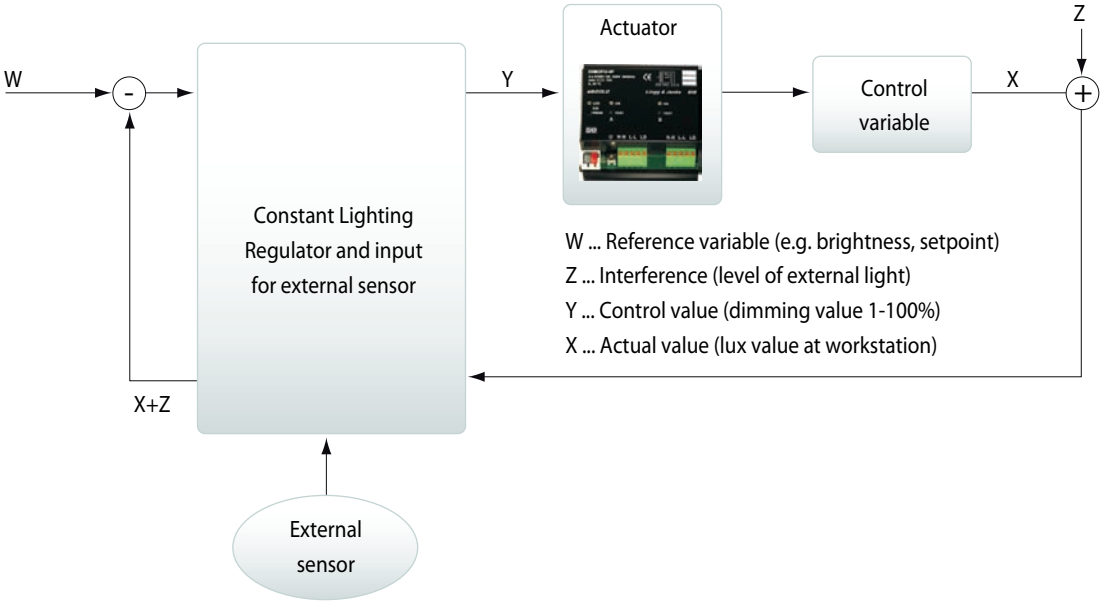

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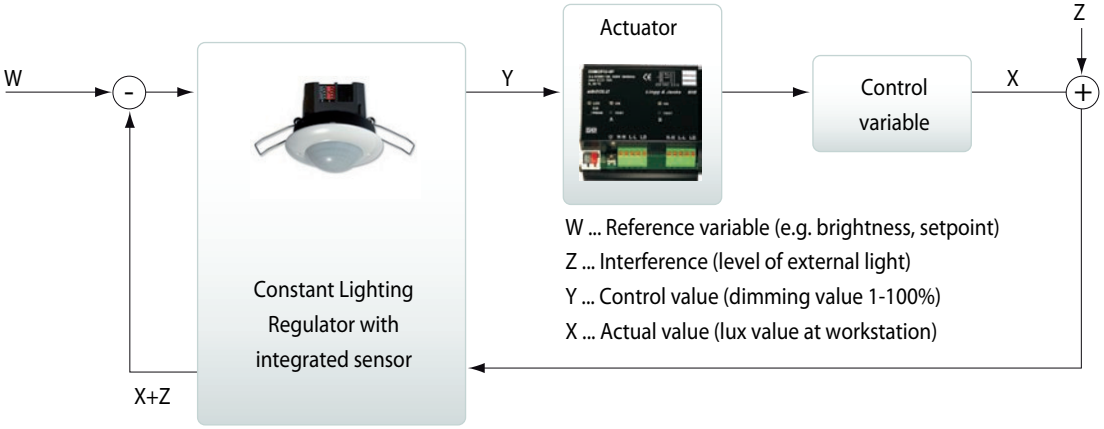

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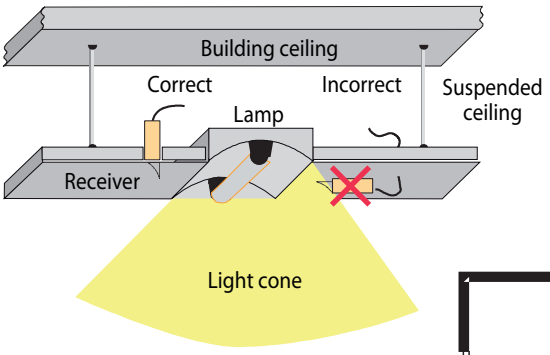
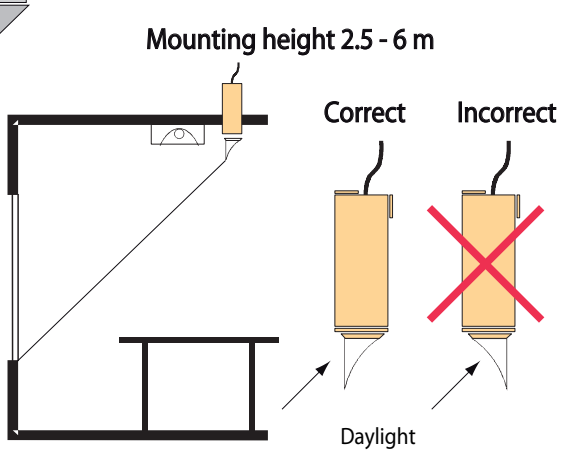
Constant Lighting Regulation (CLR)

3 Installation / location





Calibration required
Measuring sensor +/-15%

a. Preferable above the area to be regulated. (only if no interference with lights). When using components with light reflecting glass bars, the bar with the perpendicular lens should be used.

b. If not installed above the area, the bar with the inclined lens should be used.

Orientation of the inclined lens

1 Pointing to the area to be regulated.

2 Never pointing directly to the window.

3 No direct reflections (lights, sunlight, mirrors, …).

Constant Lighting Regulation (CLR)

4 ETS configuration

Dimming Actuator

2/2/9 OR 2/2/9	2/2/1	1	Switch
	2/2/2	4	Dimming
	2/2/3	8	Value
	2/2/8	8	Status Value

Push buttons / Visualization

Dimm Alternate		1	Manual Switch	2/2/1
		4	Manual dim	2/2/2
Send value		8	Manual value	2/2/3
Alternate		1	Activate Contant Lighting Regulation (CLR)	2/2/4
ON		1	Calibrate	2/2/5
Send value		16	Setpoint (LUX)	2/2/6
Send value		8	Setpoint (LUX)	2/2/7
Display		16	Actual value (LUX)	2/2/6

Contant lighting regulator (CLR)

2/2/1	1	Manual switch
2/2/2	4	Manual dim
2/2/3	8	Manual value
2/2/9	8	CLR Contant Lighting Regulation
OR		
2/2/9	4	CLR Contant Lighting Regulation
2/2/8	8	Status actuator CLR Contant Lighting Regulation
2/2/4	1	Activate Contant Lighting Regulation (CLR)
2/2/5	1	Calibrate
2/2/6	16	Setpoint (LUX)
2/2/7	8	Setpoint (LUX)
2/2/6	16	Actual value (LUX)

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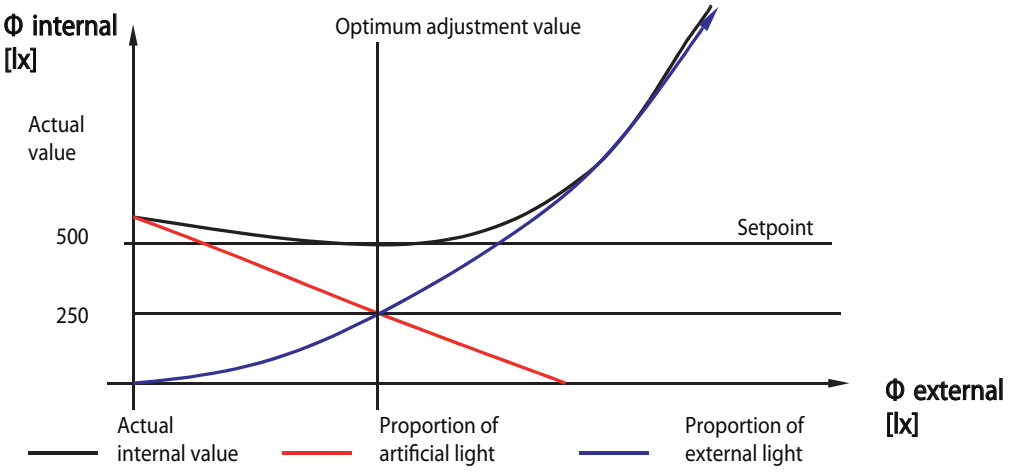
5 Calibration procedure

a. When?

1. Project evolution

   Only after everything is finished. Walls painted, carpets installed, floor decking done, furniture installed …

2. Time of day



When the natural light (sunlight) and artificial light (lighting) stand in a relation 50%/50%.

b. How? Depending on component selection some examples

1. Over 1 bit calibration object

   - Regulate to desired lux value (using lux meter situated on the area to be regulated).
   - Send a "1" to the 1 bit calibration object.
   - Done!

2. Parameter calibration

   - Regulate to desired lux value (using lux meter situated on the area to be regulated).
   - Read calibration object of the CLR using ETS.
   - Fill the received value in the calibration parameter setting.

6 When it is not recommended to realize a CLR?

a. The window too small

b. The artificial lights too faint (cannot reach the set point value when there is no, or little natural light).