# The Placement and Configurations for Daylight Sensors

## Revision History

| Date | Version | Description |
|---|---|---|
| July 2025 | V1 | First release |

## Introduction

Daylight sensors, also known as lux sensors or illuminance sensors, are used in a variety of lighting control applications. These devices are photocells or photodiodes designed to detect and measure the intensity of light in a given area, allowing us to make decisions regarding lighting, optimize energy usage, enhance security, and improve overall comfort.

This document aims to provide a comprehensive guide on the placement and configuration of daylight sensors within Koolmesh lighting control system. By following the guidelines outlined in this document, you will be better equipped to address common challenges and find effective solutions when specifying Koolmesh, ensuring the optimal performance of your daylight sensor within your lighting control system.





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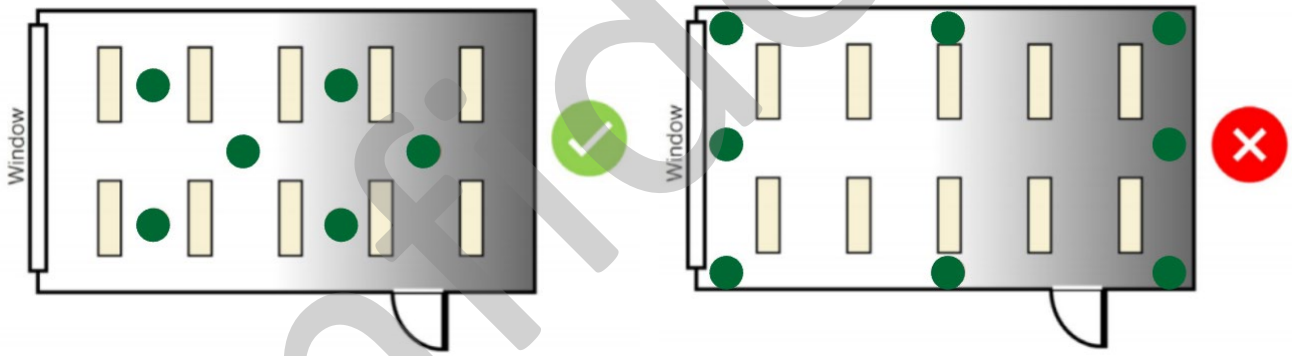
# Daylight Sensor Placement Considerations

To ensure the best results in a daylight harvesting system, it's vital to carefully choose where you position your daylight sensors. The effectiveness of your lighting control system is entirely contingent on the sensor's field of vision. This becomes especially critical in scenarios where side-lighting, reflected light, diffused daylight, or direct sunlight can impact sensor performance. Even a minor adjustment in sensor position or orientation has the potential to significantly impact the overall system's performance.

## Position and orientation

For optimal performance, sensors should be positioned and orientated in a way that they are shielded from any direct glare and sunlight.Indoor sensors should not normally be placed next to a window. Instead, position them so that they receive only indirect daylight illumination. It is important to position the daylight sensor to capture a representative sample of the available daylight in the respective area, avoiding zones with restricted field of view or dark corners.




## Sensor specification

**The Koolmesh system is compatible with two types of devices: photodiode and photocell advance. Due to differences in their functional characteristics, their applicable installation methods also vary.**

- **Photodiode**

Integrated into systems for detecting ambient light levels to enable functions like active lux switching. It works by measuring light intensity and feeding data to the control system to determine if lights should be switched on/off or dimmed .
Recommended Installation: standalone.
Reason for standalone installation:If built into a luminaire,the artificial light feedback from the luminaire itself is so strong that the photodiode reaches to a saturated/blinded status and cannot perform at all.



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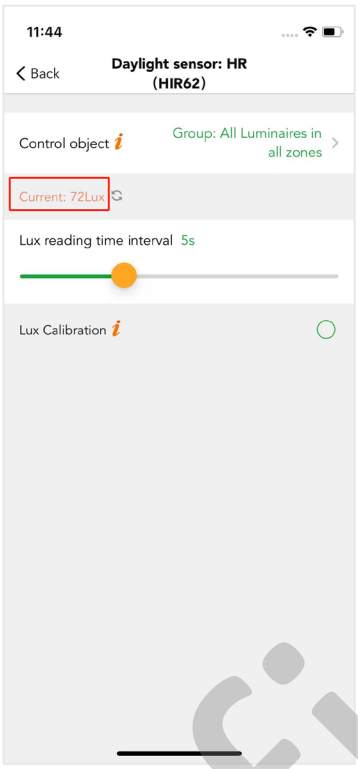
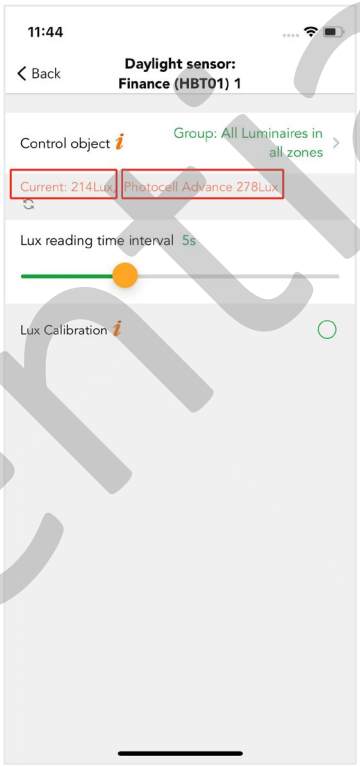
- **Photocell advance**

Integrated into sensors and supporting built-in installation, it provides accurate ambient light measurement. Based on ambient daylight levels (unaffected by the luminaire's artificial light), it adjusts light output. It also enables energy-saving functions like automatically switching off lights when natural light exceeds the preset threshold - even if the fixture is on.




If a daylight sensor uses a photodiode as its core component, it will output only one lux value—the ambient light level.




If a daylight sensor uses a photocell advance as its core component, there will be two lux values, the first one is the ambient lux value, the second one is the sunlight lux value.

**ATTENTION**:Follow the sensor manufacturer's specifications and installation instructions, as well as placement guidelines, irrespective of the chosen sensor or intended mode of operation.





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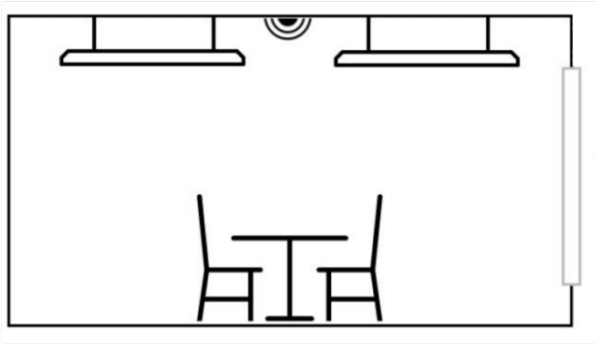
# Daylight Scene

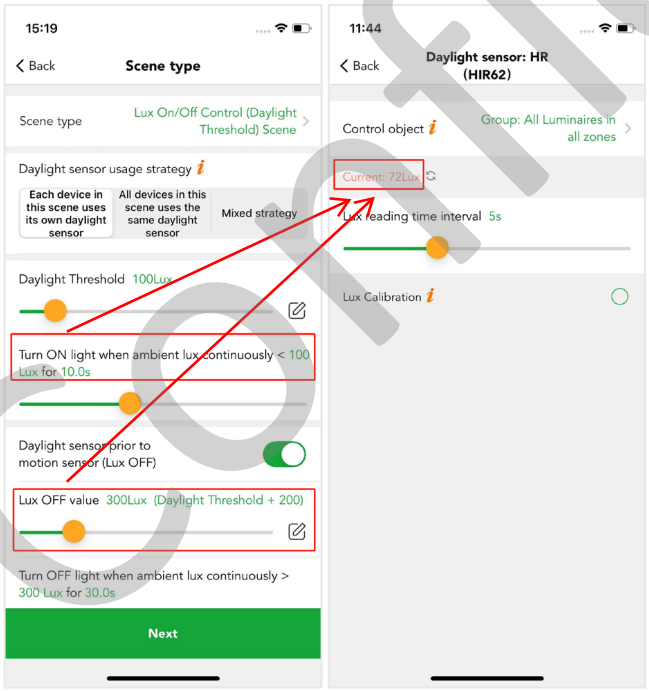
Daylight scenes utilize information provided by daylight sensors to automatically adjust the scene lighting level based on the amount of light available. There are three daylight scenes available in Koolmesh system: Lux On / Off Control(Daylight Threshold) Scene,Daylight Harvest (Closed loop) and Daylight Harvest (Open loop).

## Lux On / Off Control(Daylight Threshold) Scene：



Luminaires in an active scene will fade ON or OFF based on the configurable Daylight threshold levels:
If the daylight sensor uses the photodiode,then

- If the measured lux is below the “Turn ON” setting, the lights will be ON.
- If the measured lux is above the “Lux OFF” setting, the lights will be OFF.





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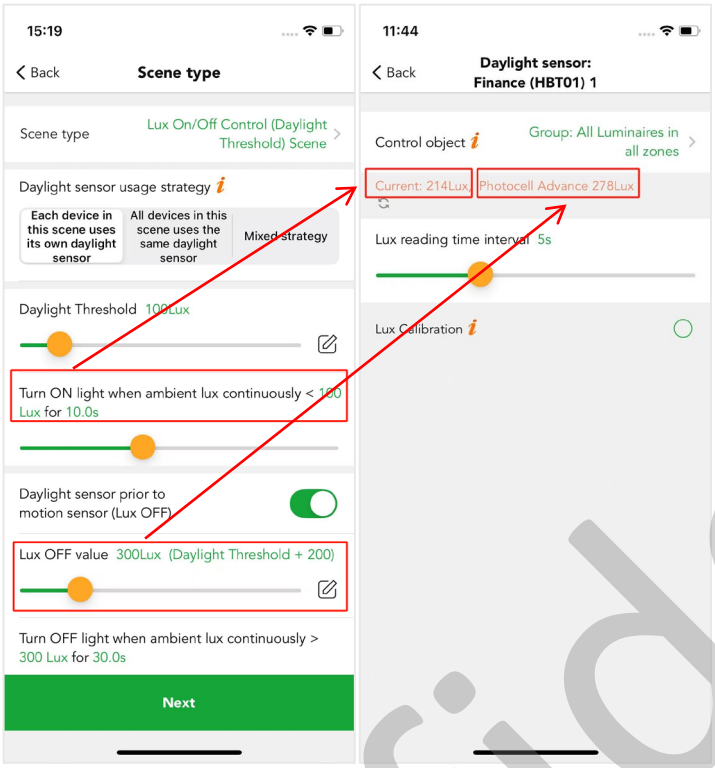
If the daylight sensor uses the photocell advance,then

- If the measured ambient lux(the first value) is below the “Turn ON” setting, the lights will be ON.
- If the measured sunlight lux(the second value) is above the “Lux OFF” setting, the lights will be OFF.





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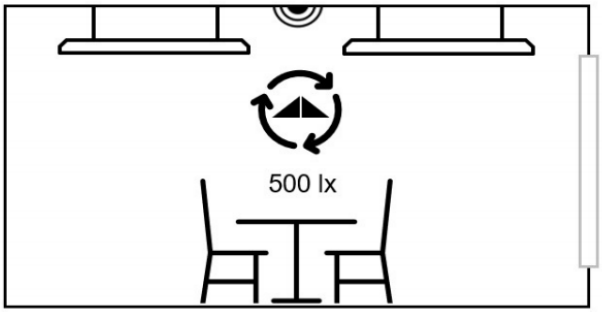
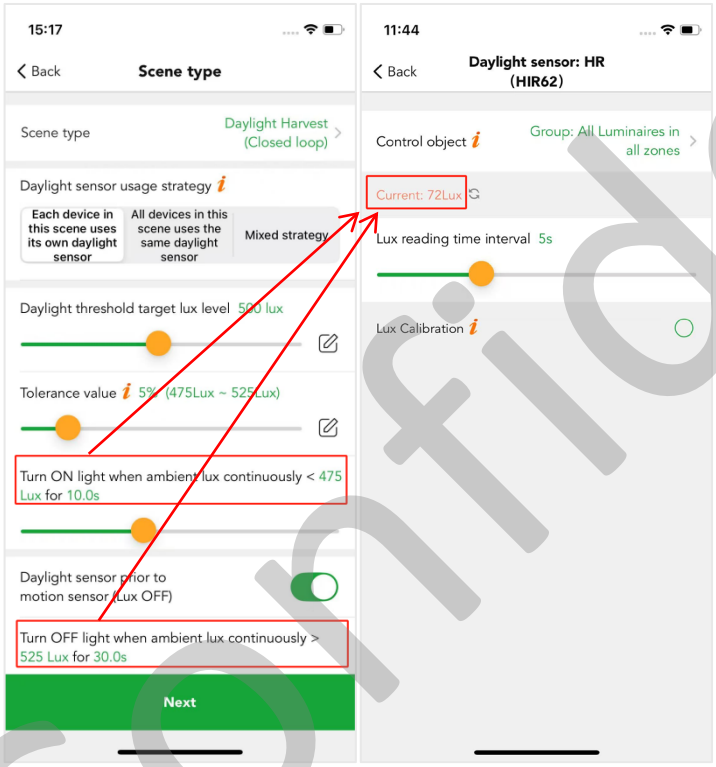
## Daylight Harvest (Closed loop)：




The sensor actively adjusts the luminaires in the active scene to try to reach and maintain a target lux level via a feedback loop (by observing the results of its own changes). Using this scene can achieve “constant light” effect.We recommend using the photodiode daylight sensor.





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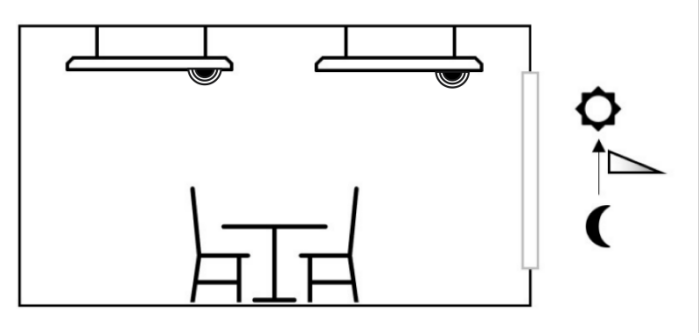
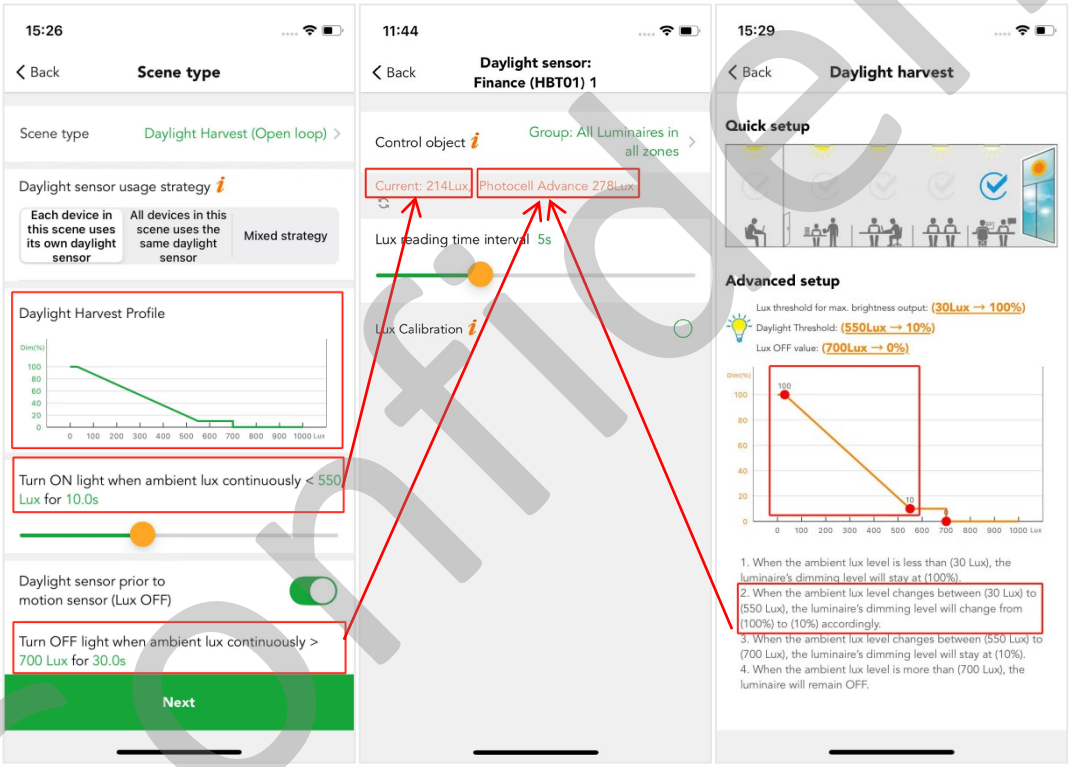
## Daylight Harvest (Open loop)：



Luminaires in an active scene will have their output level adjusted by comparing the sensor’s lux reading against a response graph.We recommend using the photocell advance daylight sensor.





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# Daylight Scenes Settings

When the desired Daylight scene has been selected, you will then need to set some parameters. The parameters to be configured are basically the same but will have some differences.






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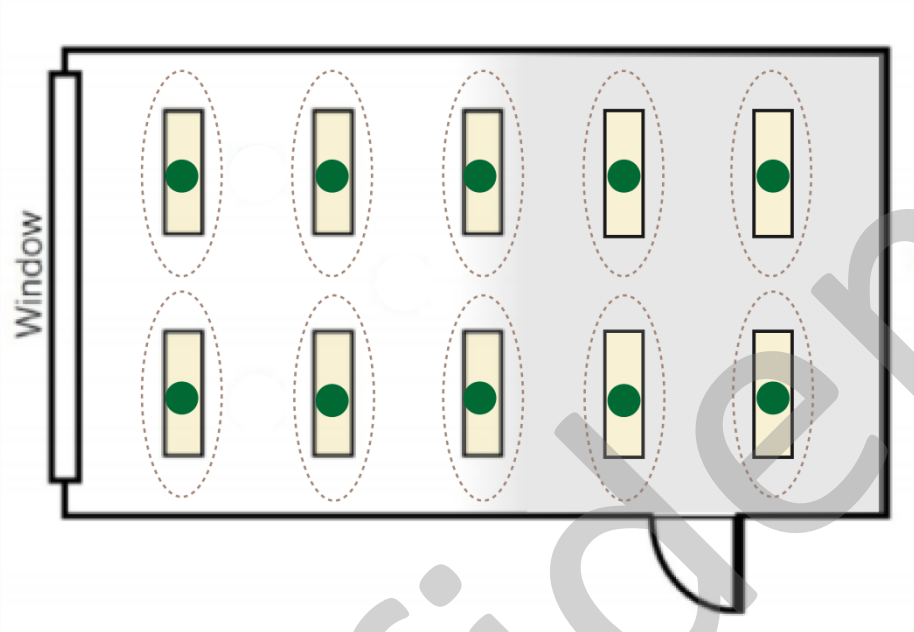
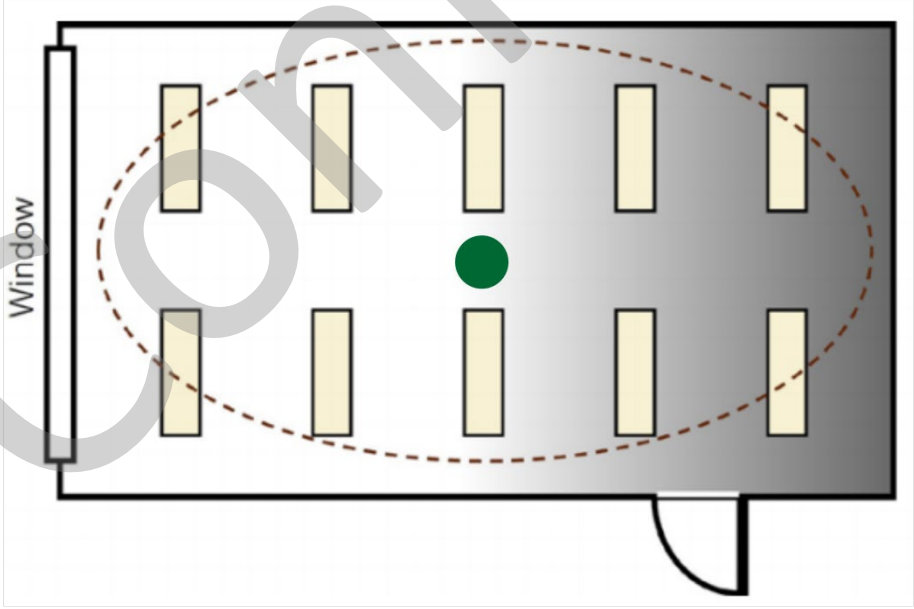
## Daylight sensor usage

**Each device in this scene uses its own daylight sensor:**If this strategy is selected,and each luminaire has a daylight sensor, the scene will obtain the daylight value from its own sensor. If the luminaire does not have a daylight sensor, the scene will not work normally.




**All devices in this scene use the same daylight sensor:**If this strategy is selected, the scene will obtain the daylight value from the candidate daylight sensor





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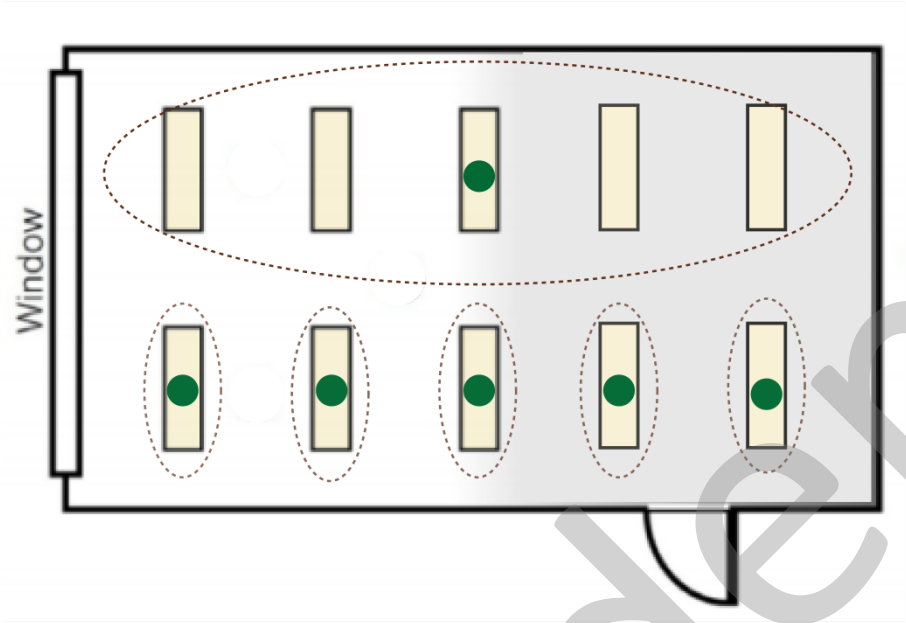
**Mixed strategy:**If this strategy is selected, the luminaire will obtain the daylight value from its own sensor when the luminaire has a daylight sensor, and the candidate daylight sensor will be used if the luminaire does not have a daylight sensor.




## Light On/Off condition settings

Users can define the thresholds for turning lights on or off as needed, and set the duration that ambient illuminance must remain below/above the trigger threshold before the light is turned on/off. If "Lux OFF" is disabled, the light will never turn off.

## Tolerance parameter

The Tolerance defines how large the changes in measured lux value need to be before the sensor will react and adjust the lighting. For example, with a target of 500 lux and a 10% tolerance, no changes occur within the range of 450 to 550 lux.The default tolerance is set at 5%. For standard use, it's advisable to select a higher tolerance, as a larger value necessitates more significant lux variations.

## Full dim range

When Use the full dim range is enabled, the daylight control can dim luminaires up to 100%. Otherwise, luminaires are dimmed up to the dim level defined in the scene.

## Change rate

Change rate corresponds to how often luminaires adjust dimming to match the daylight scene target. This is in incremental steps. i.e. Dim up a bit, check lux, dim up a bit more, check lux again, until lux is target so no dimming is needed. Also, the same for dim down.





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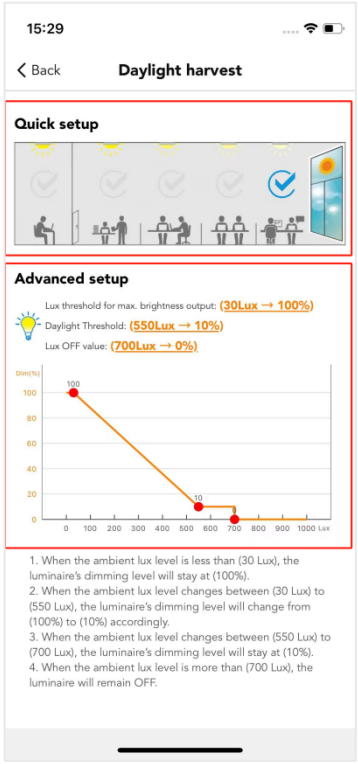
## Quick setup and advanced setup mode for Daylight Harvest (Open loop)

Quick setup allows users to quickly check the box based on the location of the device.
If the user has specific brightness requirements for specific lux values, advance settings can be used.The affected luminaires will gradually change the dim level towards the desired target, comparing the sensor's photocell advance reading against the response graph.





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# Daylight sensor calibration

In most cases, calibrating a daylight sensor may not be necessary, as the sensor technology is typically accurate. However, site-specific variations arising from differences in sensor specifications, locations, orientations, and the presence of natural and artificial lighting can necessitate calibration for Koolmesh-enabled sensors. Calibration ensures that the lux value measured by the sensor is accurately interpreted by the Koolmesh system, providing a corrected lux value for the specific application.

In Koolmesh system， we recommend doing the calibration while using the Daylight Harvest (Closed loop) scene. For example, if you want to configure a closed loop scene to achieve 500lux on a surface,then you need to follow steps below:

1. Place a lux meter on the surface below the sensor.
2. Dim the lighting to achieve the desired lux on the surface (500lux).
3. In the Koolmesh app, read the lux value being measured by the sensor (this may be, for example, 400lux).
4. Use the sensor lux value (400lux) as the “Target lux value” in the Closed loop daylight scene.





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