# Configuring Daylight Harvesting / Constant Light Level Operation

**Revision history:**

| Revision date | Author | Notes |
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| 06/05/11 | SJW | Original document written |
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## Background to Daylight Linking / Constant Light Level Control / Daylight Harvesting

There is an opportunity for considerable energy saving if daylight entering a room is monitored by a light sensor, and the levels of relevant artificial lighting within the room are controlled such that the room is not excessively lit when the daylight can be "harvested" as a useful source of illumination.

i.e. when daylight is illuminating the desk then the artificial light can be lowered. When there is less daylight, due to cloud-cover or at night, then the artificial light level is raised.
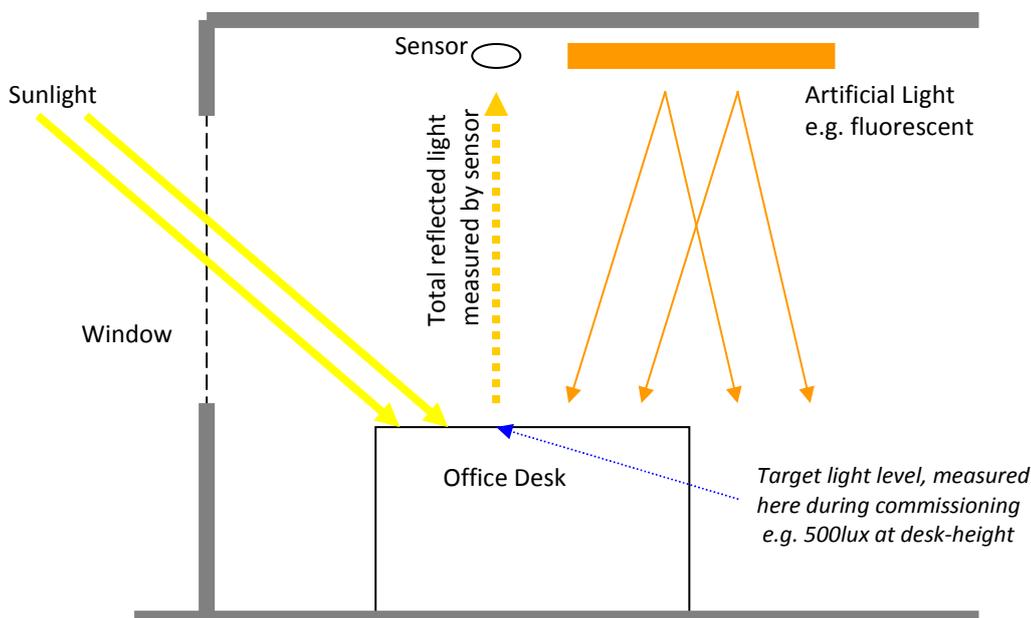


A ceiling-mounted light sensor, observing reflected light, for example from a desk below, will "see" a mixture of reflected daylight and reflected artificial light. This means that when the control system lowers the level of the artificial light the sensor will see less light. Mode's control system includes a special feature to prevent oscillation when maintaining a constant target light level.

At the time of commissioning a target light level is defined. This will be determined by the required desk-height light level, the reflectivity of the desk and it's distance to the ceiling. Uniquely Mode's software also enables this to be changed on a scene-by-scene basis. For further details see "Calibration", below.

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**Hardware Setup**

A suitable light-level sensor should be connected to an input on an input module (DIN-INT-00-08 or an UBC), such that a 0-10v signal is received from the sensor where 0v represents darkness (or a suitably low level of light, below the required set-point), and 10v represents a level of illumination above our required set point.

It does not matter if the light sensor can "see" the light from the luminaires which are being controlled, as long as it can also "see" the reflected sunlight.

Note: At the present time DALI sensors can not be used as input devices on an M-Bus network. Please contact Mode for further information on suitable sensors and firmware updates.

**Configuration (using the Evolution PC Software, Windows application)**

Create a scene containing the lights that you wish to control.

Create a rule, with it's input being the light level sensor, and other parameters as below:

Select *Scene link*

Select your output scene as the lights to control

Select *Daylight Harvesting* as the output type.

This value is the response speed; so that sudden changes in sunlight level do not induce sudden changes in illumination. Use 1'30" for DALI loads.

Use conditional logic (e.g. selective application) to enable/disable the daylight harvesting feature

Use these values as cup/cap for the dimming, so that the artificial lighting will not go below the minimum level, or above the maximum, no matter what level is measured by the sensor.

This is the target set-point. It can be modified in a scene (see below)

*NB. Before reading the rest of this document make sure that you are familiar with the concepts of creating Tracking Scenes, Selective Application in the Evolution software, and of using the Connect window to export Evolution configurations for use in an eDIN Network Processor. Further details on all of these topics can be found on the dealer-page of the Evolution website, and in the online training courses from Mode.*

## Changing the Daylight Harvesting Set-Point From a Scene

You can change the target level of the constant-light-level algorithm from with a scene.

Drag your *Daylight Harvesting* rule from the *Rule List* into a scene in the *Scene Editor*:
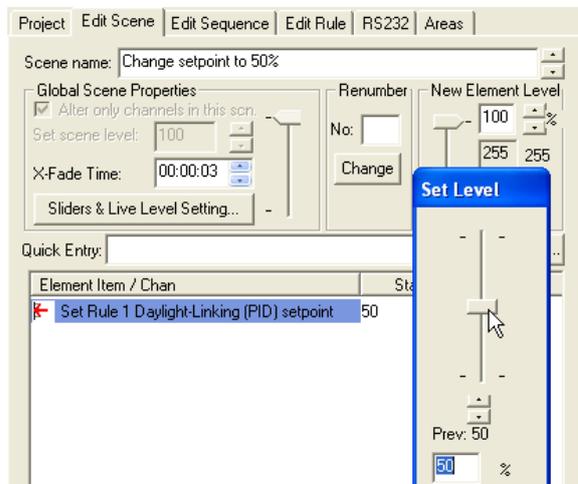
If you use a set-point level of zero, then instead of adjusting the set-point, recalling the scene will force-rule-check the *Daylight Harvesting* rule. This must be used to ensure that the light-level calculation is performed when daylight harvesting rules are first enabled.

## Enable or Disable Daylight Harvesting/Linking

Create tracking scenes, containing tracking objects, in your configuration such that you can enable/disable your daylight harvesting rules by Selectively Applying those scenes to the Daylight Harvesting rules. This is important, because you will need to be able to disable the rules during commissioning (see below).

When you recall a scene whose purpose is to activates daylight harvesting rules, by recalling a tracking scene, you must also force-check the rule that does daylight linking, as above, in order to start the calculation running:
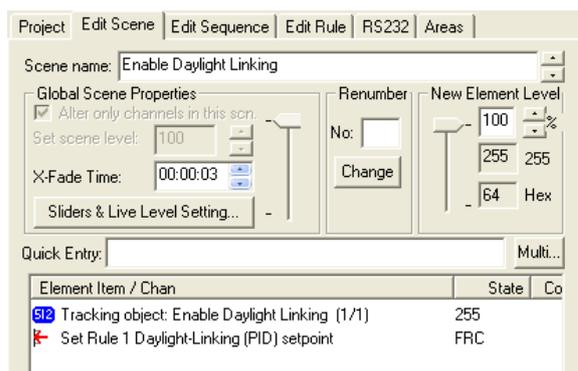
## Exporting the Configuration

To load your configuration into a Network Processor, you will need to export a .bin file from the Evolution software. This is done via the *Connect* window, using the *Create MBus .bin File* option.
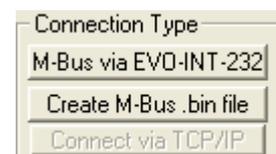
## Commissioning Set-Point Levels

 You will require a light level meter in order to commission the light level set-point for your daylight harvesting / constant-light level control. Place the light meter's sensor at the position where you want to measure your set-point, for example on the desk surface.



Select the *Scene Settings* page, from the button on the front page of the Network Processor's web pages.

Any area which has scenes that are controlled by *Daylight Harvesting* rules will be shown with a link icon in the title bar. In the example below the *Office* area uses daylight-linked control:



Click on the *Link* icon to adjust the set-point for each scene:



Adjust the level using the slider until your lux meter reads the level that you want (perhaps 500 lux at desk level?). The slider will proportionally adjust the levels of all channels in the scene.



NB it is important that any *Daylight Harvesting* rules are disabled whilst you make this adjustment to their set-points (otherwise the system will try and compensate for the change in light level and will adjust them whilst you are also adjusting them!). To disable rules, follow the guidelines above regarding selective application and trackers. In the example above two tracker scenes, called *Daylight On* and *Daylight Off,* have been created for enabling and disabling the constant-light level.

Click *OK* to save the set-point.

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## Considerations and Known Limitations

If the reflectivity of the surface below the light-level sensor is changed (e.g. a new carpet is fitted, desk colours are changed etc.) then the set-points will need to be re-commissioned as the light sensor will "see" different amounts of reflected light.

If the level of one or more channels that are part of the scene being controlled by the *Daylight Harvesting* rules are changed by something else (e.g. being switched off by another scene, or by being manually adjusted from the web browser) then the daylight-linking system will not override the new levels, and so may not be able to achieve a high set-point until the original output scene is recalled again.

### Configuration File Checklist

1. Are you using a sensor which gives a continually variable output level which is directly proportional to the light which it "sees"?

2. Have you created a *Daylight Harvesting Rule* for each sensor, and set it to *Scene Link*?

3. Have you created tracking scenes to enable/disable the daylight-linking behaviour, and selectively applied the rule above to the "enable" tracker?

4. Have you force-rule-checked the daylight-linking rule within the scene that enables daylight linking?