# **Lighting Controls Specification**

## 1.0 Purpose

This specification defines the University’s requirements for internal lighting controls, sensors and commissioning. It aims to ensure lighting control technologies are appropriate to their surroundings; ensuring controls can be easily commissioned and maintained and striking a balance between providing localised control and minimising energy use.

## 2.0 Scope

This policy covers the portfolio of the University’s UK property portfolio. It does not extend to lamp/luminaire requirements.

Where there is a conflict between this policy and national policies such as building regulations or disability access requirements, the national guidelines must take precedence.

## 3.0 Definitions

* **Absence detection:** Detects when a space has been unoccupied for a defined period of time.
* **Presence detection:** Detects when a space is occupied.
* **Daylight detection:** Detects the level of natural lighting in a space, above which lights can be set to automatically switch off.
* **PIR sensor:** A passive infrared (PIR) sensor measures infrared light radiated from objects in its view. It has limitations in how precisely it can detect small movements, and it can only detect in straight lines – meaning movement behind another object would not be picked up.
* **Microwave sensor:** Emits very low-level microwaves which sense even small movements in a space. More costly than PIR sensors but generally more effective.
* **Ultrasonic sensor:** Active ultrasonic sensors generate high-frequency sound waves and evaluate the echo received back to determine movement in a space. Passive ultrasonic sensors detect ultrasonic noise to detect movement (but do not emit sound waves).

## 4.0 Manual Controls

Where manual controls (i.e. wall switches) are fitted, the following must be considered:

* Controls must provide users with a visual indication that the lights have been turned on/off/up/down as appropriate. A rocker switch gives a simple indication of an on/off action – down for on and up for off. Scaled (e.g. 1-4) or arrow-shaped dimming switches may be considered, including LED indicators to highlight the setting selected.
* Switches should be contrasted in colour to their backing plate. White rocker switches on silver metallic plates are preferred. Switches must be large enough to distinguish from the back plate. Ideally switches should be illuminated, particularly for scaled switches, so that the user has feedback that the switch has been operated.
* Controls should always be installed by the entrance door on the same side as the door opening (not behind it). Where there is more than one entrance, controls must be replicated in each location and consideration given to the interaction of multiple switches.
* Mapping the lighting controls and switches to the luminaire layout should be intuitive and simple. Switch plates should, where practical, be designed to reflect the layout of the room. Where this cannot be achieved, switches must be clearly labelled.
* Rooms should be appropriately zoned to enable different areas of the room to be switched. This is particularly relevant where:- occupancy patterns differ, tasks in different areas differ, daylight provision differs. Room users must not be more than 6m from a light switch.

## 5.0 Lighting sensors

Where lighting sensors are installed, they should meet the following requirements:

* Sensors must be commissioned and controlled with a 2-way hand-held controller; that is a controller which can both be programmed with the required settings, and can also be used to view and revise the settings of existing sensors. 1-way controllers (which send but cannot receive settings) should not be selected. Controllers on mobile phone applications may be considered by prior agreement of the University’s Maintenance and Sustainability Services.
* Training must be provided to Maintenance Services at handover on the use/adjustment of control systems.
* Systems which require a specialist supplier to make adjustments will not generally be acceptable (without the prior agreement of Maintenance Services).
* To support good maintenance and future sensor adjustments, only controllers from the following manufacturers should be considered:- Ex-Or, B.E.G. Others may only used with the prior agreement of the University’s Maintenance and Sustainability Services.
* Sensors which require a mechanical (screwdriver) adjustment should not be installed, as they provide a poor level of granularity of control and provide no feedback on their settings.
* Microwave sensors are the preferred solution where a high-level of sensitivity is required or where obstructions may occur. PIR and ultrasonic sensors are most appropriate for small spaces.
* Consideration should be given to how the location of sensors will enable future adjustment/maintenance. Locations which require cherry pickers to access the sensors should be avoided wherever possible.
* Consideration should be given to zoning of larger locations with multiple sensors, to avoid over lighting unoccupied spaces.

## 6.0 Choosing an appropriate control solution

Lighting controls are often over-specified, which can lead to unnecessary expense, a poor user experience, a poor understanding of how to adjust the controls in the future and therefore wasted energy. This section outlines the solutions considered appropriate for different applications.

### 6.1 Classrooms & lecture theatres

*The ‘Design Criteria for Centrally Managed Teaching and Learning Spaces’ specification held by Campus Services should also be referred to*

* Manual controls are the preferred solution for classroom spaces. Dimmer controls may also be considered.
* Switching should ideally be parallel to the front of the class, though switching parallel to the window may be required in order to meet Building Regulation requirements.
* Users must be able to switch off lighting near to the front of class, to avoid glare on presentations/white boards.
* Absence detection should also be considered, so that lights switch off after an extended period of time if users have forgotten to turn them off.
* Daylight detection should also be considered where there is a high level of natural daylight, however consideration should also be given to how blinds are used to deflect solar glare, as often high levels of natural daylight may encourage blinds to be closed. Consideration also needs to be given to any conflict with the manual switching arrangements.
* Presence detection is not generally viewed as appropriate.

### 6.2 Offices

* Manual controls are the preferred solution for office spaces. Dimmer controls should not normally be considered for small offices.
* Absence detection should be installed for shared office spaces, so that lights switch off after an extended period of time if users have forgotten to turn them off. Offices for 1-2 people should have manual controls only.
* Presence detection and daylight detection are not generally viewed as appropriate.

### 6.3 Laboratories & workshops

* Manual controls are the preferred solution for laboratories and workshops.
* Absence detection should be considered for laboratories and workshops where clear lines of sight can be established covering all area of the space. Such absence detection should switch the lights switch off after an extended period of time if users have forgotten to turn them off.
* Daylight detection should also be considered where there is a high level of natural daylight. Consideration must be given to any conflict with the manual switching arrangements.
* Dimmer controls and presence detection are not generally viewed as appropriate.

### 6.4 Corridor & communal spaces

* Presence detection should be installed for corridors and communal spaces, with controls which dim after a short period of time with no presence and switch off after a further period of time with no presence detected.
* Suggested settings for corridors are 1 minute for dimming and 10 minutes for switch off.
* Suggested settings for other communal space are 10 minutes for dimming and 30 minutes for switch off.
* Daylight detection should also be included where there is a high level of natural daylight.
* The transition between adjoining spaces requires careful consideration and commissioning.

### 6.5 Meeting rooms

* Manual on/off controls should be installed.
* Absence detection should be included, so that lights switch off after an extended period of time if users have forgotten to turn them off.
* Daylight detection should also be considered where there is a high level of natural daylight. Consideration must be given to any conflict with the manual switching arrangements.
* Presence detection is not generally viewed as appropriate.

### 6.6 WCs/ kitchens/ stores

* Presence detection should be installed with manual on/off switches.

### 6.7 Plant rooms

* Manual on/off controls should be installed.
* Areas more than 6m apart should be separately zoned.

### 6.8 Sports facilities

* Manual on/off controls should be installed.
* Areas more than 6m apart should be separately zoned.

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