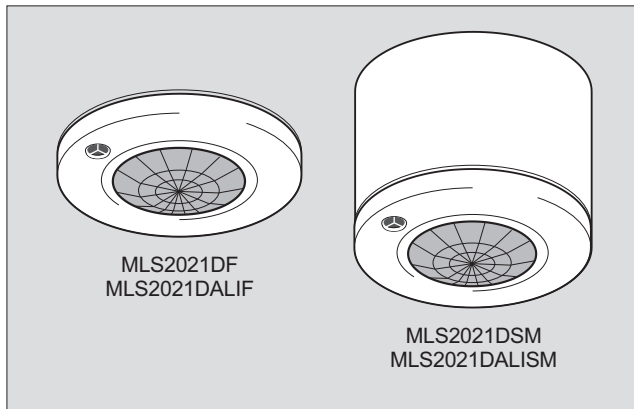




by Honeywell

**MLS2021DF & MLS2021DSM for DSI ballasts**  
**MLS2021DALIF & MLS2021DALISM for DALI ballasts**  
**Digital Gold PIR Detector**  
**with regulating photocell**



**Installation and Commissioning**  
**Instructions**

Note: HP2000 required for commissioning

## Digital Gold PIR Detector with Regulating Photocell

***Please note that UltraLite versions of these detectors (suffix CWL7) do not offer MLS functionality and cannot be connected using MLS cable.***

**Only suitably qualified personnel should install this equipment.**

This is a high-performance, communicating presence detector which can be used as part of a full Ex-Or MLS Digital Managed Lighting System or as a stand-alone unit. It is equipped with a regulating photocell to control digital DSI or DALI ballasts (when using the detector's Digital Output) and a volt-free output for control of non-dimmable lighting loads. The product incorporates Ex-Or's OneSwitch Dimming, local manual operation of any controlled lighting load.

### Fixing

**MLS2021DSM/DALISM** - The housing may be secured to a hard surface or to a BESA box. The unit fits into the housing with a simple bayonet action.

**MLS2021DF/DALIF** - Supplied with a sinking (dry-lining) box for flush fitting. The sinking box fits into an 89mm diameter hole in a ceiling tile or plasterboard ceiling. To avoid damage to ceiling tile do not overtighten. Depth required behind ceiling 62mm from front flange plus an allowance for the minimum bend radius of the cable. No access above the ceiling is necessary.

### Electrical Connections

This detector should be connected in accordance with the diagrams overleaf. Both the Digital Output and MLS connections are polarity-free however other MLS products require that polarity be maintained. The MLS cable should be mains-rated, unscreened, twisted pair of at least 1.5mm CSA. For further information please refer to Wiring Application Guide AN4001. ***Please note that UltraLite versions of these detectors (suffix CWL7) do not offer MLS functionality and cannot be connected using MLS cable.***

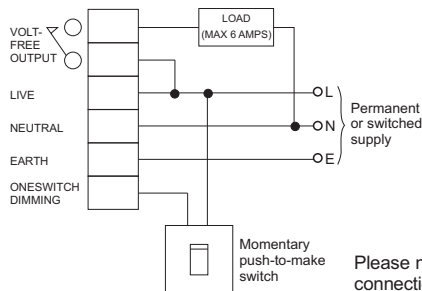
The detector is designed to control up to 25 DSI or DALI luminaires, a switched load of up to 6 Amps or a combination of the two. When controlling DSI or DALI ballasts the ballast type must not be mixed. The DSI or DALI input terminals on the ballasts should be connected in parallel with each other and to the Polarity-Free Digital Output terminals on the rear of the detector. Each DSI or DALI luminaire is controlled completely by its digital input and therefore would normally have a permanent power supply. Turning the power off to some lights within a control circuit will not affect the operation of those lights that remain powered up and under the control of the detector.

When switching via the volt-free output, multiple MLS2021D detectors may be connected in parallel provided the controlled load does not exceed 6 Amps.

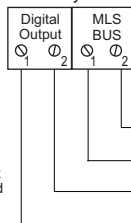
***Note: The digital dimming signals of two detectors should NEVER be connected together. Their only connections should be to the digital inputs of high frequency ballasts of the correct type.***

### MLS2021D

Using OneSwitch, MLS\*, Switched and Digital Outputs



These Connections are Polarity-Free

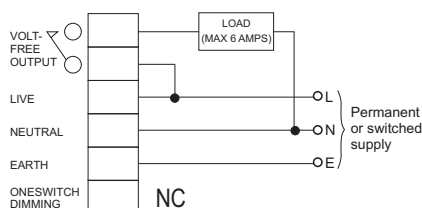


\* UltraLite-version detectors (suffix CWL7) do not offer MLS functionality and cannot be connected using MLS cable.

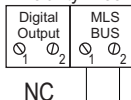
Please note that the Earth terminal has no internal connection and is used for termination only.

### MLS2021D

Using Switched Output and MLS\*



These Connections are Polarity-Free



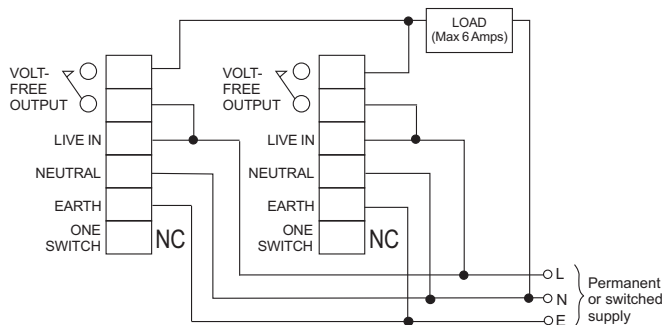
\* UltraLite-version detectors (suffix CWL7) do not offer MLS functionality and cannot be connected using MLS cable.

Please note that the Earth terminal has no internal connection and is used for termination only.

### 2 x MLS2021D

In Parallel, using Switched Output only

Any connection not shown is NO CONNECTION



Relay outputs may be connected together in parallel to cover larger areas, however the total load on all combined relay outputs must not exceed 6 Amps.

## Commissioning

The units are supplied with the factory default settings shown below which make further commissioning unnecessary in many applications. To make use of the programmable settings, an infrared commissioning tool is required (HP2000). A ten-second time delay is selectable from programmer to aid commissioning.

## Sensitivity to Movement

While the factory settings will be correct for many applications, the sensitivity can be adjusted if required. The ON RANGE setting controls the sensitivity, with higher numbers giving greater sensitivity. Like all programmable parameters, the sensitivity setting will be retained in the event of a power failure and can be re-programmed any number of times.

## Factory Default Settings

These are the settings to which the units have been programmed before they leave the factory.

| Parameter      | Options                       | Default Setting | Notes   |
|----------------|-------------------------------|-----------------|---|
| Power up       | ON/OFF                        | ON              | Each of these settings can be re-programmed, if desired, by use of the infrared programming tool HP2000. All settings are retained in the event of a power failure. |
| Response       | Auto, Manual/Bus, Manual Only | AUTO            |   |
| Off delay      | 1min - 96hrs, Disabled        | 20 min          |   |
| On Sensitivity | 0-100                         | 100             |   |
| Bus Connect    | YES/NO                        | YES             |   |
| 1st Zone       | 1-100 addresses               | -               |   |
| 2nd Zone       | 1-100 addresses               | -               |   |
| 3rd Zone       | 1-100 addresses               | -               |   |
| 4th Zone       | 1-100 addresses               | -               |   |
| Corridor 1     | 1-100, Building Zone Span     | -               |   |
| Corridor 2     | 1-100, Building Zone Span     | -               |   |
| Global 1 Rx    | YES/NO                        | NO              |   |
| Global 2 Rx    | YES/NO                        | NO              |   |
| Manual I/P     | LOCAL/SHARE                   | LOCAL           |   |
| Start Lamps    | MAX/MIN                       | MAX             |   |
| Entry Scene    | Scene 1-6                     | Scene 1         |   |
| Lamp Max       | 10% - 100%                    | 100%            |   |
| Dimming        | Regulate 100% to 50%          | 100%            |   |
| Fade to Off    | YES/NO                        | NO              |   |
| Vacant         | (10 Alternative Exit Scenes)  | OFF             |   |
| Bright-Out     | YES/NO                        | NO              |   |
| Photocell      | Active, Passive, Disabled     | Disabled        |   |
| Set Point Low  | 1-1023                        | 1023            |   |
| Set Point High | 1-1023                        | 1023            |   |

## **Photocell Control**

### **i) Regulating Photocell**

Regulating photocell control tries to maintain a constant level of total illumination in the space controlled by dimming and brightening the controlled luminaires to compensate for changes in illumination from other sources.

With the photocell configured as DISABLED the Regulating Control module is influenced only by the BRIGHT-OUT setting. BRIGHT-OUT = YES allows it to hold-off the lights at the start of occupancy if natural light already exceeds SET-POINT LOW and to extinguish the lights during occupancy if total light, after the controlled luminaires have been dimmed to minimum, exceeds SET-POINT HIGH continuously for a period equal to the OFF DELAY . The lighting is restored immediately if the illumination level subsequently drops below SET-POINT LOW.

If the photocell is configured for ACTIVE or PASSIVE control of the relay switched load then the Regulating Control module adopts the decision made by the Switching Control module in the case of turn-on inhibit on entry, but still obeys the BRIGHT-OUT YES/NO setting with regard to turn-off during occupancy.

### **ii) Switching Photocell (PHOTOCELL: ACTIVE or PASSIVE)**

Both ACTIVE or PASSIVE modes hold off the controlled lighting on entry when natural light is sufficient, i.e. SET-POINT LOW is exceeded, but only ACTIVE mode will extinguish the lighting if natural light increases sufficiently during occupancy, i.e. SET-POINT HIGH is exceeded continuously for a period equal to OFF DELAY. The lighting is restored immediately if the illumination level subsequently drops below SET-POINT LOW.

### **iii) Photocell DISABLED**

If the photocell is configured as DISABLED for relay Switching Control it will have no effect on the control of that load, which will be ON continuously during periods of occupancy unless commanded OFF via manual switch or infrared control. The photocell readings are still available for use by the Regulating Control module while in this mode.

## **Programming the Photocell Set-points.**

The parameters SET-POINT LOW and SET-POINT HIGH programme the detector's photocell response. The SET-POINTS can be manually programmed as numbers between 1 (darkest) and 1023 (brightest). This number is not scaled to correlate with 'lux' measurements made using a light meter, but nevertheless is a true representation of the light level perceived by the detector. To assist with finding the appropriate SET-POINT settings, the light level currently perceived by the photocell can be viewed on the HP2000 screen briefly, following a download operation. The number represents the light level read immediately before the download took place.

## Programming the Photocell Set-points (Continued)

*Tip: Turn the lights off (HP2000 UTILITIES/USER-REMOTE) to measure the perceived light level with no contribution from the controlled lighting.*

Alternatively the SET-POINTS can be configured semi-automatically;

### i) The Primary Interest is the Regulating Control Output.

With the photocell configured as DISABLED:-

Using HP2000 (UTILITIES / SET LIGHT LEVEL) or HC5 (+, - Scene 1) set the required light output from the controlled luminaires and then press and hold OK (HP2000) or Scene 1 (HC5) until the controlled lights "blink" to indicate that a new SET-POINT LOW has been stored and a calculated SET-POINT HIGH has also been inserted. Using the HP2000 the photocell can now be re-configured as ACTIVE or PASSIVE if required.

### ii) The Primary Interest is the Switching Control Output

With the photocell configured as ACTIVE or PASSIVE:-

1) If the lights are not already on, switch them on manually by pressing 'UTILITIES/USER-REMOTE/Luminaire+/OK' (HP2000) or "+" (HC5). Fluorescent lights do not reach full output until up to 15 minutes after being switched on, so ensure that the lights are fully warmed up before continuing.

2) Wait until the time of day when the natural light level is at the point below which you **would** want the lights to be on, and above which you **would not** want the lights to be on.

3) Start the internal self-programming mechanism by pressing 'UTILITIES/SET LIGHT LEVEL/OK' (HP2000) or Scene 1 (HC5). The detector takes a photocell reading, adds a small amount and stores the value in SET-POINT HIGH. Then it turns the lights off, makes another measurement and stores the value in SET-POINT LOW. The lights now switch on again to acknowledge a successful programming operation.

The two switching thresholds have now been set, and the difference between them is equal to slightly more than the contribution made by the electric lighting. This is the perfect amount of hysteresis to ensure that the lights will not oscillate.

## OneSwitch

OneSwitch Dimming affords local control to the end-user whereby a simple, momentary, push-to-make wall switch can be used to raise or lower the lighting level or toggle the output of the unit ON or OFF. A short press (less than 1 second) toggles all outputs from *both* OFF to *both* ON or from *either* ON to *both* OFF. A long press will ramp the digital output either up or down with no effect on the volt-free output. If the output prior to pressing the switch is above 90% the output will ramp down; if below 90% it will ramp up. If the latest press and the current press are within 5 seconds of each other it will ramp in the opposite direction. A latching switch can be used to override the outputs OFF or ON at maximum output.

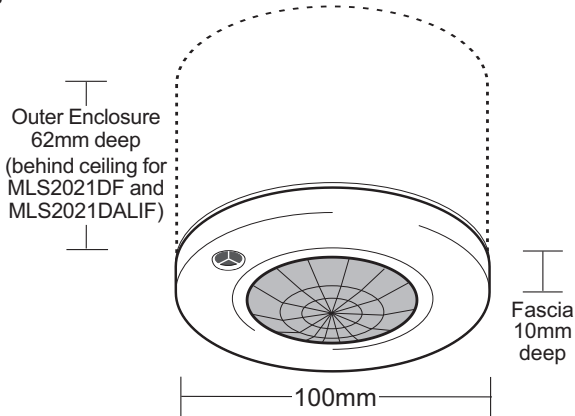
## User Overrides

The end-user can configure a number of lighting scenes that can be recalled using a hand-held override. With an HC5 hand-held controller lighting can be overridden OFF or ON, or a set level can be chosen, affecting either the controlled group or, with an MLS system, the whole zone. Regulating and switched loads can be adjusted independently through a combination of OneSwitch Dimming and the HC5.

## Important Additional Notes

1. All terminals on this product are provided for final connections. It is not intended that the product be used as a junction box for looping cables.
2. A means for disconnection must be incorporated in the fixed wiring in accordance with the current wiring regulations.
3. Although nominally 12V, the dimming output is not SELV and therefore should be treated with the same respect as mains with regard to wiring practice.
4. The dimming control output should be connected only to the control input of the ballasts - never to other detectors.
5. Due to the fact that the photocell is on the ceiling looking down, it is not possible for measurements made with a lux meter on the working plane to remain constant when daylight illuminates the ceiling and the working plane to a differing extent. Therefore, products of this type should be regarded as capable of maintaining an APPROXIMATE light level only.
6. This equipment switches lights no more frequently than would a responsible human occupant. However, manufacturers of some lighting types (e.g. '2D' luminaires) may specify a maximum number of switching cycles in order to achieve a predicted lamp life. Please check with the manufacturer of the luminaires to ensure that they are compatible with automatic controls in this respect.

## Dimensions

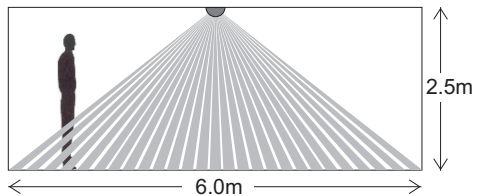


## Technical Data

MLS CABLE : 1.5mm<sup>2</sup> unscreened twisted-pair (applicable when detector is used as part of a full MLS Digital Managed Lighting System): see Application Note AN4001

MAXIMUM RECOMMENDED MOUNTING HEIGHT: 3.0m

RANGE: Cone-shaped detection pattern, diameter (at floor level) = 2.4 x mounting height



OFF DELAY: 1 minute - 96 hours (adjustable)

PHOTOCELL: Adjustable 50-5000 lux via HP2000

OPERATING VOLTAGE: 230V ~ 50Hz (UK & Europe)

PRODUCT RATING AND RECOMMENDED CIRCUIT

PROTECTION: 10 Amps

MAXIMUM RECOMMENDED LOAD (VOLT-FREE): 6 Amps

MAXIMUM RECOMMENDED LOAD (DSI/DALI): 25 Ballasts

COLOUR: White (RAL9010)

MATERIAL: Flame retardant PC/ABS

WEIGHT: 200g approx

IP RATING: 3X

## Ex-Or

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