DIRECT DIM

DIMMING CEILING PRESENCE DETECTOR

Direct Dim is a ceiling mounted presence detector that offers presence detection and dimming control in one simple unit. A host of energy saving features are combined in Direct Dim to provide a simple cost effective solution to energy efficiency.

Offering presence detection via passive infrared, Direct Dim provides a DSI or DALI dimming output in addition to a switched relay output. The dimming channel of the detector can be used to control the light output of luminaries that are fitted with dimming ballasts. The detector measures the overall light level in the detection area and calculates the correct output for the luminaries, to achieve a preset lux level. The two outputs can operate together or independently, allowing one output to be dimmed whilst the other output is switched. Two switch inputs are included to allow manual control: for example absence detection on either channel; dimming up/down; or override on/off. The use of a two position switch allows simple dimming up and down, rather than awkward single switch control. The detector can be set using either integral presets or by using a separate handset for more detailed functions.

Please note:
Direct Dim detectors can control
up to 20 dimming ballasts

DETECTION RANGE DIAGRAM ON PAGE 45

NEW PRODUCT

APPLICATIONS

- Commercial offices
- Education
- Public buildings

KEY FEATURES AND BENEFITS

Absence detection	Enhanced energy saving
Daylight linking	Constant light level
Dual output	Flexible control
Manual switch inputs	User override
Manual dimming	Adjustable light output
Integral set up	Quick commissioning
User handset (optional)	Allows user to override detector
Scene setting	User comfort

ORDER CODE	DESCRIPTION	LOAD RATING AT 230VAC Incandescent Fluorescent Compact Fluorescent			TIME DELAY
EBDSPIR-DD	Direct dimming presence detector DSI/DALI	8A	6A	3A	10 sec-30 min
DD-LCDHS	Programming handset for Direct Dim detectors				
UHS	User handset override on/off; lux up/lux down				
UHS3	User handset override on/off				
DBB	Surface mounting back box				

Please note: for 1-10V analogue dimming applications refer to our website.

QUICK FIT INSTALLATION

CEILING TILE
The detector can be mounted into a ceiling tile using a flush mounting clip which comes as standard. This can be adjusted to suit different depths of ceiling tile.

SURFACE MOUNTING
The detector can be surface mounted using the optional surface mounting box (part number DBB), which mounts onto a BESA box or directly onto the ceiling surface. Knockouts are provided for mini trunking access.

1. Cut hole and mount flush mounting clip

2. Set timing and light level and plug in connections

3. Fix into ceiling clip
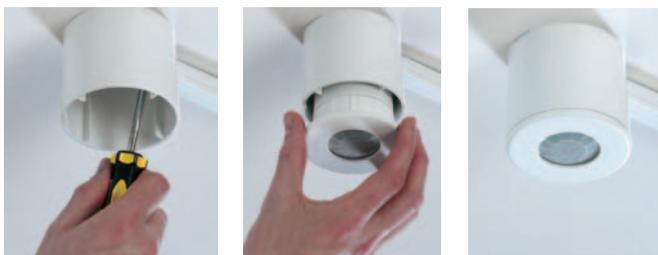
1. Mount surface box onto the ceiling, and remove mini trunking knockout

2. Set timing and light level and plug in connections

3. Fix into detector box

MWS-3DD

Direct Dim is a ceiling mounted presence detector that offers presence detection and dimming control in one simple unit. A host of energy saving features are combined in Direct Dim to provide a simple cost effective solution to energy efficiency.

Offering superior multi sense presence detection via microwave, Direct Dim provides a DSI or a DALI dimming output in addition to a switched relay output. The dimming channel of the detector can be used to control the light output of luminaires that are fitted with dimming ballasts. The detector measures the overall light level in the detection area and calculates the correct output for the luminaires, to acheivea preset lux level The two outputs can operate together or independently, allowing an output to be dimmed whilst the other output is switched. Two switch inputs are included to allow manual control, for example absence detection on either channel or dimming up/down or override on/off. The use of a two position switch allows simple dimming up and down rather than awkward single switch control. The detector can be set up using either integral presets or by utilizing a separate handset for the more detailed functions.

DETECTION RANGE DIAGRAM ON PAGE 46-47

Please note:
Direct Dim detectors can control up to 20 dimming ballasts

NEW PRODUCT

KEY FEATURES AND BENEFITS

Absence Detection	Enhanced energy saving
Daylight linking	Constant light level
Dual output	Flexible control
Manual switch inputs	User override
Manual dimming	Adjustable light output
Integral setup	Quick commissioning
User handset (optional)	Allows user to override the detector
Scene setting	User comfort

APPLICATIONS

- School classrooms
- Colleges
- Universities
- Public buildings
- Retail
- Commercial offices

ORDER CODE	DESCRIPTION	LOAD RATING AT 230VAC				TIME DELAY
		Resistive	Incandescent	Fluorescent	Compact Fluorescent	
MWS-3DD	Direct Dim microwave presence detector DSI/DALI	10A	10A	10A	10A	15 sec- 30 min
DD-LCDHS	Programming handset for Direct Dim detectors	10A	10A	10A	10A	15 sec- 30 min
UHS	User handset override on/off, lux up, lux down					
UHS3	User handset override on/off					
	UK Patented. No. 0411069.8					

Please note: For 1-10V analogue dimming applications refer to our website

9. SPECIFICATION

LOAD
Channel 1 (switching):
10A of lighting and or ventilation including incandescent, fluorescent, compact fluorescent, low voltage (switch primary of transformer).

Channel 2 (dimming):
20 x dimming ballasts (DSI or DALI)

SUPPLY VOLTAGE	220-240 Volts AC 50 Hz
TIME OUT PERIOD	Adjustable 10 seconds to 99 minutes
LIGHT LEVEL	Light to dark
FIXING METHOD	Flush fixing in 86mm hole using clip provided
	Surface fixing using integral back plate

TERMINAL CAPACITY 1.5mm^2
MATERIAL Flame retardant ABS, fixing clip polypropylene
TYPE Class 2
TEMPERATURE -10°C to 35°C
SAFETY The microwave radiation emitted by these units is exteremely low power.
At a distance of > 50mm the power density is <6% of the ANSI
IEEE C95.1 –1991 recommended microwave power density.
At a distance of 5mm from the unit it is <84% of recommended power density.
CONFORMITY EMC-89/336/EEC
LVD-73/23/EEC CE

10. PART NUMBERS

MWS3-DD	Microwave presence detector
MWS3-DD/ABS	Microwave absence detector
MWS3-DD/PRG	Microwave detector pre-commissioned (contact sales department)
DD-LCDHS	IR remote control programming handset with LCD screen
UHS	IR remote control user handset with lux and scene setting functionality
UHS3	IR remote control user handset with on/off override only

BSI REGISTERED
FM45789

ESTA
energy services and technology association

Ref %WD205 Draft

PRODUCT DATA AND INSTALLATION SHEET

MWS3-DD DIRECT DIM MICROWAVE PRESENCE DETECTOR

Direct Dim

CONTENTS

1. DIMENSIONS

2. DESCRIPTION AND OPERATION

The MWS3-DD microwave presence detector provides automatic control of lighting loads with optional manual control. It can be used on incandescent, fluorescent and compact fluorescent lighting and DSI or DALI digital dimming ballasts over 1 or 2 channels. The MWS3-DD detects movement using a highly sensitive microwave detector. This works by emitting low power microwave signals and measuring the reflections as the signals bounce off moving objects. The MWS3-DD has a unique adjustable sensor head that allows the area of detection to be optimised for the application.

The dimming channel of the detector can be used to control the light output of luminaires that are fitted with dimming ballasts. The detector measures the overall light level in the detection area and calculates the correct output for the luminaires, to achieve a preset lux level (maintained illuminance).
The switching channel of the detector can either be used to isolate the supply to the dimming ballasts (saving on the standby current of the ballasts) or to switch a separate channel of standard, non-dimming luminaires.

Two input terminals can be used to manually override the dimming levels and override the lights on or off.

The flexibility of having two channels and two switch inputs allows the following example scenarios:
1. Dim an outside row of luminaires whilst internal fittings are switched
2. Provide absence detection (see below) for two separate channels
3. Maintained illuminance system with manual up/down controls

An integral infra-red sensor in the unit allows the unit to be programmed using the optional DD-LCDHS programming handset. This gives complete flexibility over many of the operating parameters. Without the handset, manual adjustments can be made to the sensitivity, lux and time settings using the controls on the rear of the sensor head.

The UHS user handset can be used to change output lux levels and override the lights on or off.

Two standard units are available:

MWS3-DD - presence detection:
When movement is detected the load will automatically turn on. When the area is no longer occupied the load will automatically switch off after an adjustable time period.

MWS3-DD/ABS - absence detection:
The load is manually switched on. When the area is no longer occupied the load will automatically switch off after the adjustable time period has elapsed. Note that the MWS3-DD can be programmed to absence detection using the programming handset.

In most applications the MWS3-DD can be used with simple manual adjustment. However, the MWS3-DD unit has a comprehensive set of features that can be set using the DD-LCDHS handset. Alternatively the units can be commissioned as follows:

- On-site commissioning service - please contact our sales department for details.

- Pre-commissioning service - the units will be despatched to site with the correct features set. The part number will read MWS3-DD/PRG followed by the project reference number. Please contact our sales department for details.

IDEAL FOR OPEN PLAN AREAS AND OFFICES
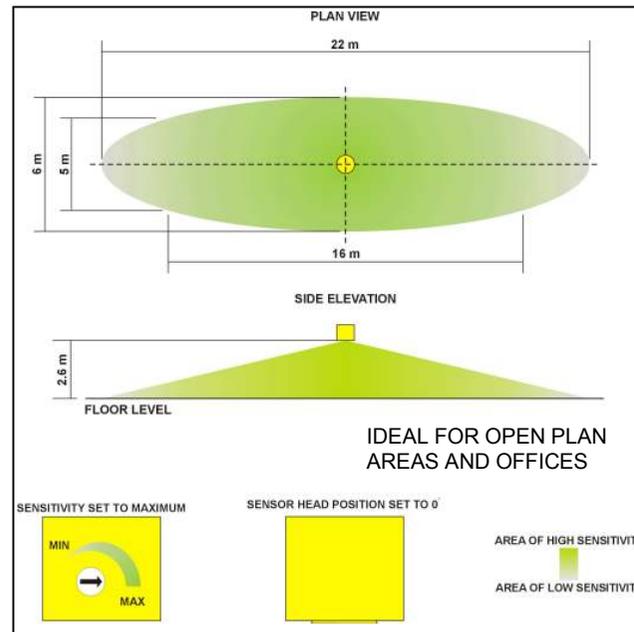
8. FAULT FINDING

LOAD DOES NOT COME ON

Check to see if the live supply to the circuit is good. Strap across the *L* and *LIVE OUT* terminal to turn the load on.

If the supply and wiring are good, check the switch on lux level setting. Increase the setting to allow the controller to turn on at higher ambient natural light level.
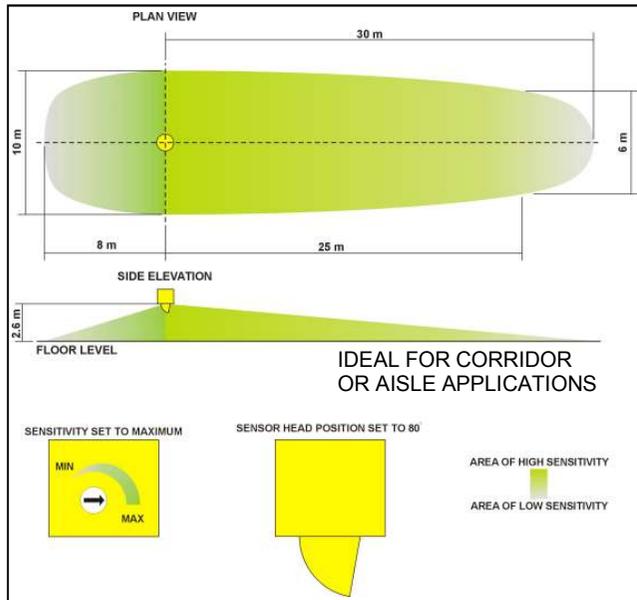
LIGHTS DO NOT GO OFF

Ensure that the area is left unoccupied for a greater time period than the time out period set using the switch.

Make sure that the sensor is not adjacent to vibrating surfaces or objects (e.g. ventilation equipment).

The unit may pick up movement through glass, thin partitions or walls. Reduce the sensitivity by turning the adjuster anticlockwise.

The unit may pick up movement that occurs behind the sensor. Reduce the sensitivity by turning the adjuster anticlockwise.

7. DETECTION PATTERNS

PLAN VIEW
25 m
8 m
4 m
6 m
20 m

IDEAL FOR CORRIDOR OR AISLE APPLICATIONS

SIDE ELEVATION
2.6 m
FLOOR LEVEL

SENSITIVITY SET TO 80%
MIN
MAX

SENSOR HEAD POSITION SET TO 80°

AREA OF HIGH SENSITIVITY
AREA OF LOW SENSITIVITY

PLAN VIEW
30 m
10 m
6 m
8 m
25 m

IDEAL FOR CORRIDOR OR AISLE APPLICATIONS

SIDE ELEVATION
2.6 m
FLOOR LEVEL

SENSITIVITY SET TO MAXIMUM
MIN
MAX

SENSOR HEAD POSITION SET TO 80°

AREA OF HIGH SENSITIVITY
AREA OF LOW SENSITIVITY

3. WIRING & FIXING

Wire the products using the diagrams shown in section 6.

To switch from more than one position simply wire two or more units in parallel using the Live, Neutral, Switched Live and manual switch wires only. The dimming connection must be wired to one unit only.

The detector should be sited so that the occupants of the room fall inside the detection pattern shown in section 7, at a recommended ceiling height of 2.8m.

Corridors or aisles: the unit should be placed at the end of the corridor or aisle and the sensor head should be angled to look down the corridor or aisle.

Open plan areas and offices: the unit can be mounted in a corner looking outwards in which case the sensor head should be angled, or the unit can be mounted in the centre of the area with the sensor head flat.

Note that the higher the sensor is installed the shorter the detection range will be.
- Do not site within 1 metre of any lighting or ventilation equipment.
- Do not fix to a vibrating surface.
- Do not fix to a suspended luminaire.
- Site as far away as possible from the surface of metal objects.

To flush mount:
- Cut a 86mm hole in the ceiling
- Insert the mounting clip into the hole and carefully push the two fixings on the arms downwards until they grip firmly to the ceiling
- Unscrew the back plate, connect (see below) and re-fix the back plate
- Push the unit into the clip and setup as instructed below

To surface mount:
- Unscrew the back plate and fix straight to the ceiling or to a BESA box
- Connect and re-fix the back plate
- Setup as instructed below

4. INSTALLATION

Warning. This device works at mains potential. Be sure to take care when working with electricity.
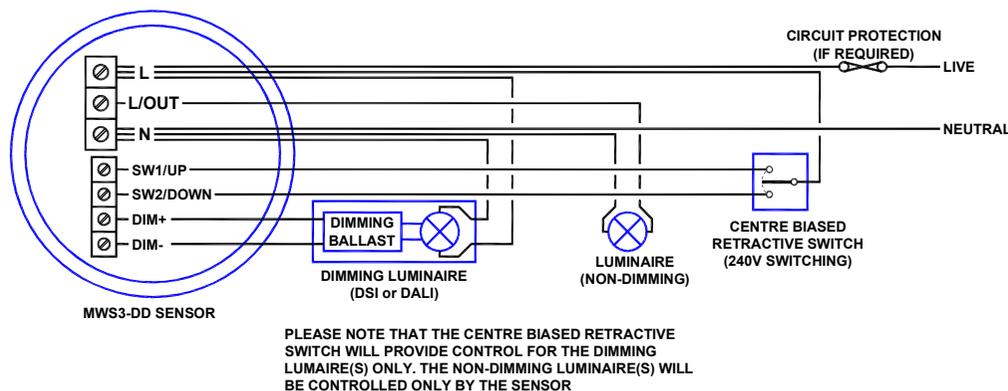
1. Make sure the load is connected and in working order.

2. Isolate the mains supply to the circuit at the main consumer unit.

3. Connect the sensor via the terminal blocks. Live supply to the **L** terminal; load to the **L/OUT** terminal; Neutral to the **N** terminal on the green terminal block. Dimming / external connections should be made as required according to the applicable wiring diagrams shown in section 6.

4. Swing the sensor head down using the finger slot to expose the manual adjustment screws on the rear of the sensor head.

5. Use a small screwdriver to set the LUX level adjuster fully clockwise, the time to minimum (fully anticlockwise) and the sensitivity to maximum (fully clockwise) using the diagram below.

6. Apply power—the load should come on immediately.

7. Vacate the room or remain very still and wait for the load to switch off (should take no more than 2 minutes).
   Check that the load switches on when movement is detected.

8. To set the LUX level wait until the level of natural daylight is just enough that lighting is required. Starting with the LUX adjuster fully anti-clockwise. Very slowly turn the adjuster clockwise until the lights come on. Note that when the LUX adjuster is fully clockwise then the lights will **always** come on with occupancy.

9. Select the time out range using the adjuster, fully clockwise is the maximum.

10. The area of detection can be varied by altering the angle of the sensor head and the sensitivity adjuster. Note: on maximum sensitivity this unit is extremely sensitive to movement and may detect through glass, thin walls or partitions. If this causes a problem reduce the sensitivity by turning the adjuster anticlockwise.

11. *Using the UHS or UHS3 infra-red handset: the override on button turns the unit on permanently; the override off button turns the unit off permanently; the cancel button cancels the overrides. When an override is selected an LED will flash inside the unit. The UHS handset can also be used to set the lux levels—see Section 5.5*

Note: the above adjustments can also be made using the DD-LCDHS handset instead of the manual adjusters. See section 5.
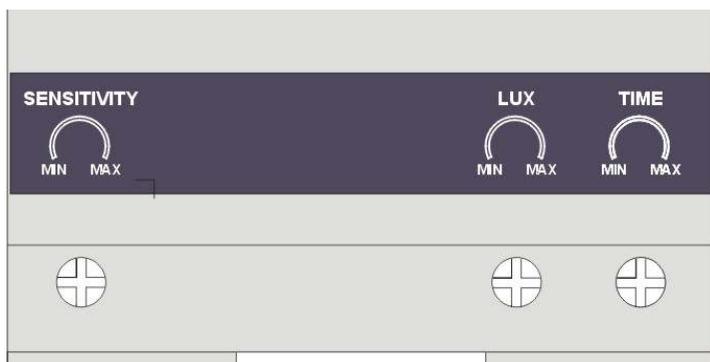
View on the rear of the sensor head
showing manual adjustment controls

6.3 Two channel, common switch (continued)

PLEASE NOTE THAT THE CENTRE BIASED RETRACTIVE SWITCH WILL PROVIDE CONTROL FOR THE DIMMING LUMAIRE(S) ONLY. THE NON-DIMMING LUMINAIRE(S) WILL BE CONTROLLED ONLY BY THE SENSOR
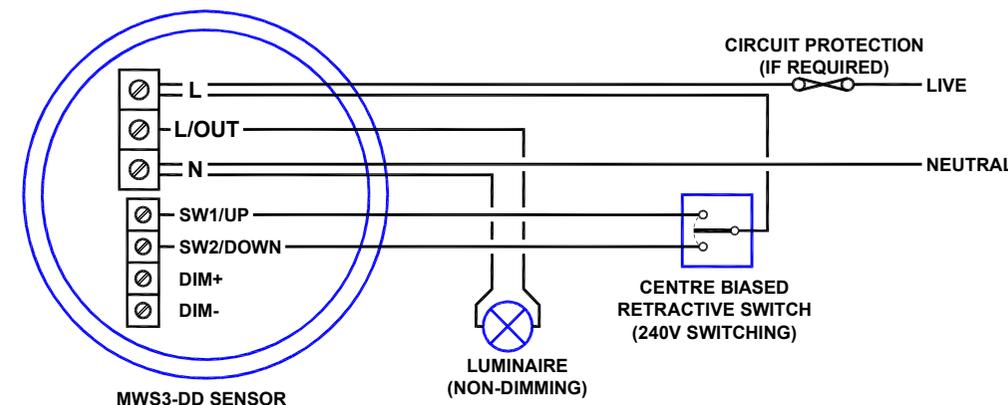
6.4 Single channel switching

Functions: Switches channel 1 only with occupancy, optional override switch. No dimming output.

Configured to presence detection: Turns on automatically with occupancy. Press and release down switch to turn off. Press and release up switch to turn back on. Turns off after occupancy.

Configured to absence detection: Press and release up switch to turn on. Press and release down switch to turn off. Turns off after occupancy.

Channel mode: Set to "Switch only"

Switch mode: Set to "2 position switch together". Note: a single position switch can be used instead to toggle the output, set to "1 position switch separate".
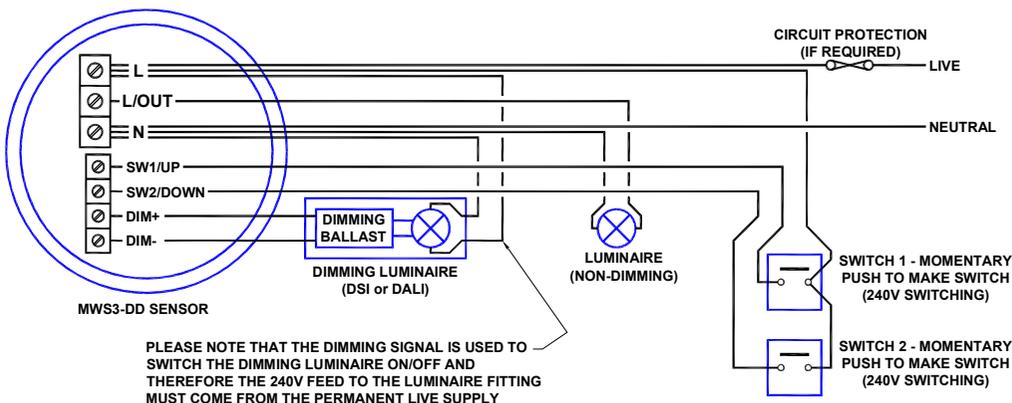
6.2 Two channel, individual switches

Functions: Switches both channels with occupancy. Maintains illuminance, dims and switches the dimming channel using optional single position retractive switch (switch 2). Switches the switching channel using the optional single position retractive switch (switch 1).

Configured to presence detection: Turns on automatically with occupancy. Maintains illuminance (dimming channel only). Press and release switch to toggle output. Press and hold switch to dim up and down (reverses direction with each press). Turns off after occupancy.

Configured to absence detection: Press and release switch to turn on. Maintains illuminance (dimming channel only). Press and release switch to turn off. Press and hold switch to dim up and down (reverses direction with each press). Turns off after occupancy.

Channel mode: Set to "Switch and dim separate"

Switch mode: Set to "1 position switch separate"

6.3 Two channel, single switch

Functions: Switches both channels with occupancy. Maintains illuminance, dims and switches the dimming channel using optional centre biased retractive switch .

Configured to presence detection: Turns on automatically with occupancy. Maintains illuminance (dimming channel only). Press and release down switch to turn off. Press and release up switch to turn back on. Press and hold up switch to dim up, press and hold down switch to dim down. Turns off after occupancy. Channel 1 does not operate with switch.

Configured to absence detection: Press and release up switch to turn on. Maintains illuminance (dimming channel only). Press and release down switch to turn off. Press and hold up switch to dim up, press and hold down switch to dim down. Turns off after occupancy. Channel 1 does not operate with switch.

Channel mode: Set to "Switch and dim separate"

Switch mode: Set to "2 position switch separate"

All the following functions can be programmed using the remote control DD-LCDHS handset:

1. Detector Parameters (factory default in brackets):

1.1	**Time adjustment** (20 min)	10 seconds to 99 minutes time delay (select 0 for 10 second delay – use for commissioning only).
1.2	**Sensitivity On** (9)	Sensitivity level when the detector is already operational adjustable between 1 (min.) and 9 (max.)
1.3	**Sensitivity Off** (9)	Sensitivity level for switching the detector on – adjustable between 1 (min.) and 9 (max.).
1.4	**Power Up On** (Y)	Select No for a 30 second delay on start up. If Yes is selected, there will be no delay on start up and the detector will always power up detecting.
1.5	**Walk Test** (N)	An LED behind the detector lens will flash to show movement has been detected (use for commissioning).
1.6	**Disable Detector** (N)	Disables detection, leaving the relay output permanently off with the dimming output operational. This mode is used when the unit is for maintained illuminance only.
1.7	**Factory Default**	Restores factory default settings.

2. Modes (factory default in brackets):

2.1 Channel Modes

2.1.1	**Switch only**	Usually used for absence detection - in this mode the dimming channel is not used.
2.1.2	**Switch and dim together** (default)	The detector will switch and dim the lighting together.
2.1.3	**Switch and dim separate**	Provides 2 channel operation – Channel 1 is switched via the relay output, and Channel 2 is dimmed / switched via the dimming output.

2.2 Switch Modes

2.2.1	**2 position switch together** (default)	A single centre biased retractive switch will be used to control both channels together.
2.2.2	**2 position switch separate**	A single centre biased retractive switch will be used to control only the dimming channel.
2.2.3	**1 position switch together**	A single position retractive switch controls both channels together.
2.2.4	**1 position switch separate**	Two single position retractive switches, controlling the channels separately.

3. Switching Channel 1 functions (factory default in brackets):

3.1	**Presence detection** (MWS3-DD default)	Auto switch on with detection, auto off after movement ceases and time delay ends.
3.2	**Absence detection** (MWS3-DD/ABS default)	Manual switch on, auto off after movement ceases and time delay ends.
3.3	**Switch level on** (9)	Lux level setting to prevent the luminaires being switched on if the ambient light level is sufficient (adjustable between 1 and 9). The luminaires will always be switched on at level 9.
3.4	**Switch level off** (9)	Lux level setting to switch the luminaires off during occupancy if the ambient light level goes above the setting (adjustable between 1 and 9). Level 9 will always keep the lights on. This setting can be used for "window row switching".

4 Dimming Channel 2 functions (factory default in brackets):

4.1	**Light level**	Maintained illuminance level (adjustable between 1 and 999). At 999 the output will be always be at maximum.
4.2	**Presence detection** (MWS3-DD default)	Auto switch on with detection, auto off after movement ceases and time delay ends.
4.3	**Absence detection** (MWS3-DD/ABS default)	Manual switch on, auto off after movement ceases and time delay ends.
4.4	**Switch level on** (9)	Lux level setting to prevent the luminaires being switched on if the ambient light level is sufficient (adjustable between 1 and 9). The luminaires will always be switched on at level 9.
4.5	**Switch level off** (9)	Lux level setting to switch the luminaires off during occupancy if the ambient light level goes above the setting (adjustable between 1 and 9). Level 9 will always keep the lights on. This setting can be used for "window row switching".
4.6	**DSI** (default)	Selects DSI dimming
4.7	**DALI**	Selects DALI dimming
4.8	**Memorise** (N)	If this is set to Yes, the last manual lux level set will be memorised and used as the new switch on level.
4.9	**On value** (99)	Dimming output level when switched on (0-99).
4.10	**Off value** (0)	Dimming output level when switched off (0-99). If set to anything other than 0 the light will not switch off but maintain a background lighting level.
4.11	**Fade value** (10)	After occupancy ceases, this dimming output level is loaded for the fade time (adjustable between 0 and 99).
4.12	**Fade mins** (0)	This is the time period (adjustable between 0 and 99 minutes) that the luminaire will be held at the fade value before turning off. A value of 0 disables the fade function.
4.13	**Max value** (99)	Maximum dimming output level (adjustable between 0 and 99).
4.14	**Min value** (1)	Minimum dimming output level (adjustable between 0 and 99).
4.15	**Speed on** (80)	Determines the dimming response speed after the setup time has finished. Measured in 0.1 sec intervals.
4.16	**Speed set** (20)	Determines the dimming response speed during the set up time. Measured in 0.1 sec intervals.
4.17	**Set seconds** (120)	Determines how long the dimming response set-up period lasts on power-up or on setting change (adjustable between 1 and 999 seconds). This enables the desired lux level to be achieved rapidly when the lights come on, or during setup.

5 User Menu

DD-LCDHS user menu or UHS handset functions:

5.1	**Lux up**	Increase light level. Reverts when occupancy cycle complete.
5.2	**Lux down**	Decrease light level. Reverts when occupancy cycle complete.
5.3	**Scene up**	Steps up between 6 pre-defined scenes.
5.4	**Scene down**	Steps down between 6 pre-defined scenes.
5.5	**Scene#**	Select the individual scene, between 0 and 6. (1 = min. output; 2 = 10%; 3 = 25%; 4 = 50%; 5 = 75%; 6 = 100%)
5.6	**Override on**	Permanently overrides the luminaire output on.
5.7	**Override off**	Permanently overrides the luminaire output off.
5.8	**Cancel**	Cancels the on or off override, returning the detector to normal operation.
5.9	**Set**	If sent before using lux up or lux down, it will set the light level as in 4.1

6. WIRING DIAGRAMS

6.1 Single channel dimming

Functions: Switches the luminaire with occupancy and maintains illuminance. Dims and switches using optional centre biased retractive switch (MK K4900 or similar).

Configured to presence detection: Turns on automatically with occupancy. Maintains illuminance. Press and release down switch to turn off. Press and release up switch to turn back on. Press and hold up switch to dim up, press and hold down switch to dim down. Turns off after occupancy.

Configured to absence detection: Press and release up switch to turn on. Maintains illuminance. Press and release down switch to turn off. Press and hold up switch to dim up, press and hold down switch to dim down. Turns off after occupancy.

Channel mode: Set to "Switch and dim together".

Switch mode: Set to "2 position switch together".

MWS3-DD SENSOR

L
L/OUT
N
SW1/UP
SW2/DOWN
DIM+
DIM-

DIMMING BALLAST

DIMMING LUMINAIRE (DSI or DALI)

CIRCUIT PROTECTION (IF REQUIRED)
LIVE
NEUTRAL

CENTRE BIASED RETRACTIVE SWITCH (240V SWITCHING)