PHILIPS

OccuSwitch DALI

Specification Sheet

LRM207x, LRM208x, LRM209x OccuSwitch DALI sensor/controller

The OccuSwitch DALI is a combined sensor and controller. It will dim and switch the lights in a room or area on occupancy and available daylight, with options for local override, parallel operation and network links to Building Management Systems (BMS).

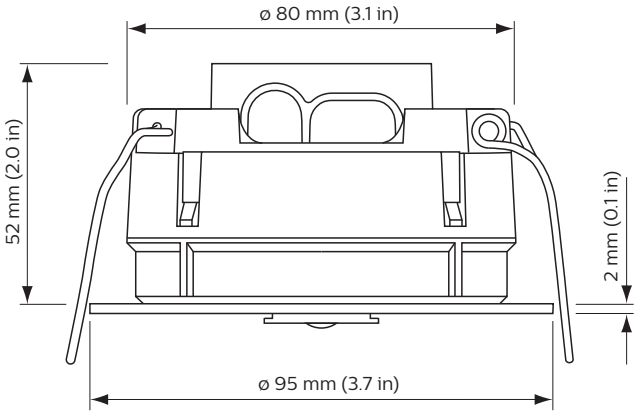
LRM207x, LRM208x, LRM209x

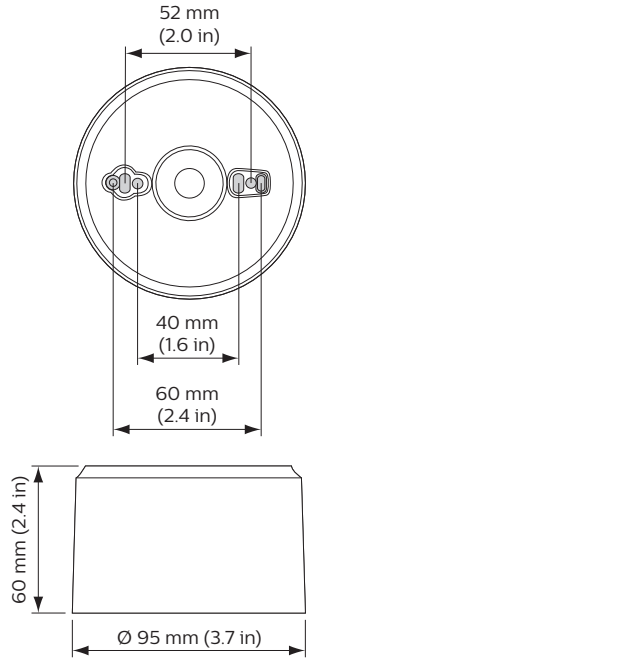
Savings up to 75% can be achieved with functions like daylight depending dimming, occupancy control and over dimension correction.
The OccuSwitch DALI is designed for an office area of 20.25 m², or a classroom of around 40 m² but the area can be doubled, or even tripled, with the extension sensor LRM8118. Up to 15 luminaires can be controlled.
A detachable wiring connector enables easy installation and mounting in the ceiling. Separate Wieland cables are available for an even more easy, fast and trouble-free installation.
It is possible to link up to 22 OccuSwitch DALI units in parallel to cover larger area's with a specific "open plan" mode to ensure maximum comfort and savings.
The LRM2090 can be linked to most BMS or other control systems that have standard DALI interfaces. This makes simple yet very effective control scenarios in a building possible.

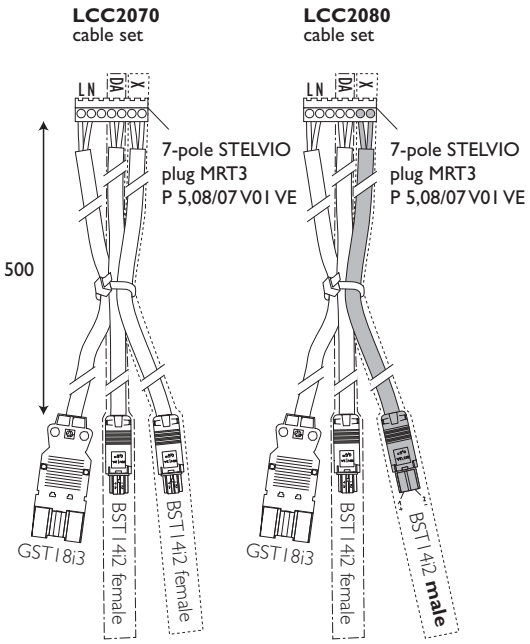
The OccuSwitch DALI family exists of:

- LRM2070 Basic functionality
- LRM2080 Parallel operation
- LRM2090 DALI interface for BMS or other network
- LCC2070 Wieland cable for LRM2070
- LCC2080 Wieland cable for LRM2080 and LRM2090
- LRH2070 Ceiling mounting box
- IRT8097 OmniProg easy, commissioning tool
- IRT8099/10 OmniProg, commissioning tool

Dimensional drawing







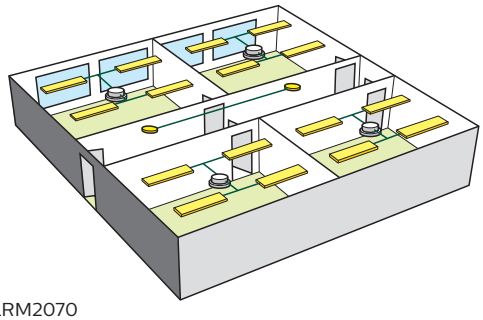
Applications

The OccuSwitch DALI is designed for use in offices and similar applications like schools, including corridors, meeting rooms, etc. It is optimized for recessed ceiling mounting and for mounting heights between 2.5 and 4 meter.
The surface box allows surface mounting as well, with either recessed wiring or surface mounted ducts.

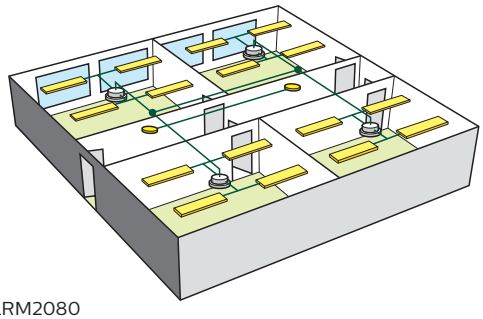
The advanced OccuSwitch DALI can be connected in parallel (max 22) to cover larger area's like open plan offices. The use of different mains groups or even phases is no problem.

The OccuSwitch DALI design guide gives all necessary design information for offices, schools and meeting rooms.

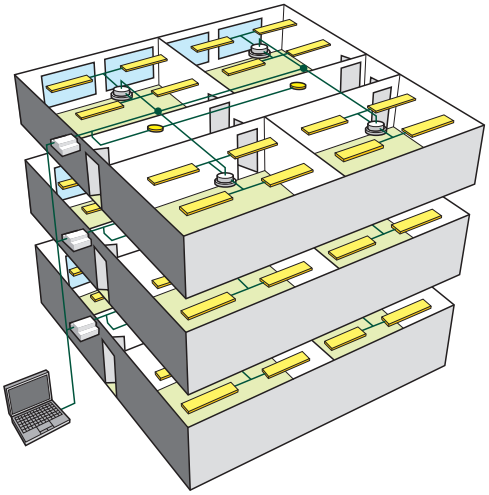
Typical applications



LRM2070



LRM2080

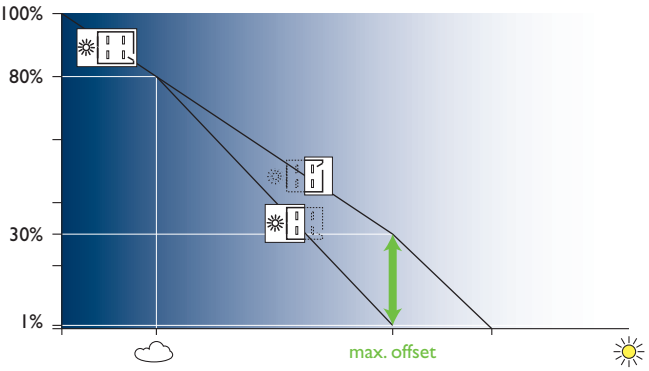


LRM2090

Features

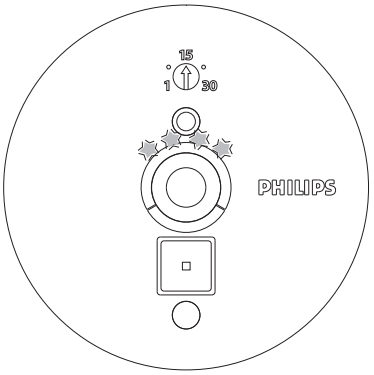
Window/corridor and dynamic offset control

For optimal energy savings the window and corridor luminaires are controlled separately as indicated in the graph. Window-side lights will switch off (or not switch on entrance, the daylight override function) when sufficient daylight is available. The corridor side however will by default dim to minimum only, hence indicating to the user that the system is operational. This feature can be disabled.



Energy indicator

The LED on the OccuSwitch DALI indicating movement or communication will change color depending on the energy usage. Dimming levels below 30% will show a green color, below 70% yellow, and above red.



LRM2080

DALI addressing

The OccuSwitch DALI can be used with one channel only or two (window /corridor control), using the physical outputs (LRM2070 only). However all versions can be used with DALI addressing as well. Up to 4 channels can be defined.

DALI group	Function
0	General
1	Window
2	Corridor
3	Additional presence
4	Additional absence

The additional luminaire groups can switch on together with the window and corridor groups or only switch on manually (absence). All groups will switch off when the area is vacated.
Pre-programmed luminaires will be recognized upon start-up

Auto commissioning

The OccuSwitch DALI can determine the light level that is generated by the luminaires itself and take this as set point for the daylight depending regulation. This is easy to use without the need for a Lux meter.

DALI network interface

The LRM2090 can be controlled with a DALI network interface. This means that this device can be connected to most BMS or other control system with a DALI interface. This enables functions like switching on/off or dim, scenes and queries for lamp/ballast states, the set light level and even more functions. With an specific gateway, supporting the OccuSwitch DALI BMS functions, it is also possible to use parallel occupancy control, very much like the OccuSwitch DALI advanced.

Commissioning tools

The OccuSwitch DALI comes with two commissioning tools, the Omniprog and Omniprog easy. With both tools the light levels can be set, witnessing mode be started and window/corridor be assigned. The Omniprog can also set the desired mode, Start-up behaviour, IR group and assign more luminaire channels.

IRT8087, OmniProg easy

IRT8099/10, OmniProg

Witnessing mode

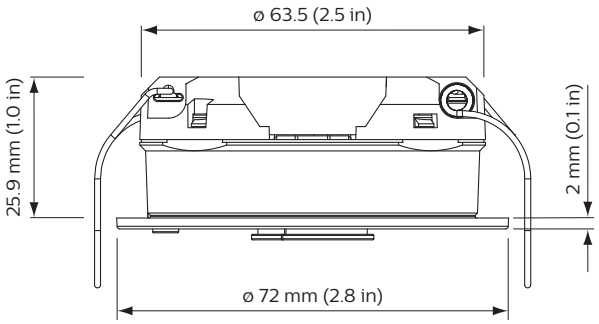
With the Omniprog (easy) the witnessing mode can be started. This makes it possible to check if the OccuSwitch DALI and the connected luminaires are correctly installed and fully operational, Quick and easy.

100 hours burn-in

Many lamp manufacturers advise not to dim fluorescent lamps for a 100 hours period prior to normal use. Especially to maintain the light quality at (very) low dimming. The OccuSwitch DALI can do this automatically. During 100 hours lights will not be dimmed, and all dimming functions are adapted. Only during witnessing (to test the installation) and commissioning dimming is allowed to make the necessary adjustments.

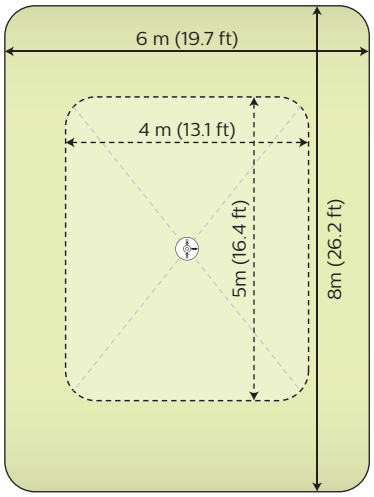
Extension sensor

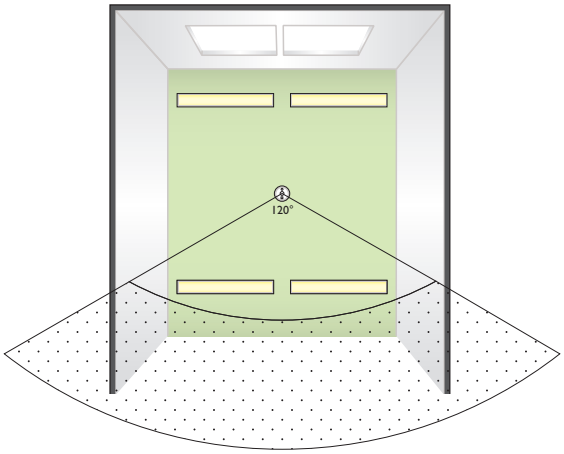
The LRM8118 extension movement detector can be used to double the movement detection area. This sensor is connected to the same DALI channel as the luminaires. Installation is simple since mains is not required.



Smart Timer

On some occasions with very little movement it is possible that the standard delay time of the OccuSwitch DALI is too short. If movement is detected during switch off (including fade this takes 10 seconds), the delay timer is automatically increased by 10 minutes.





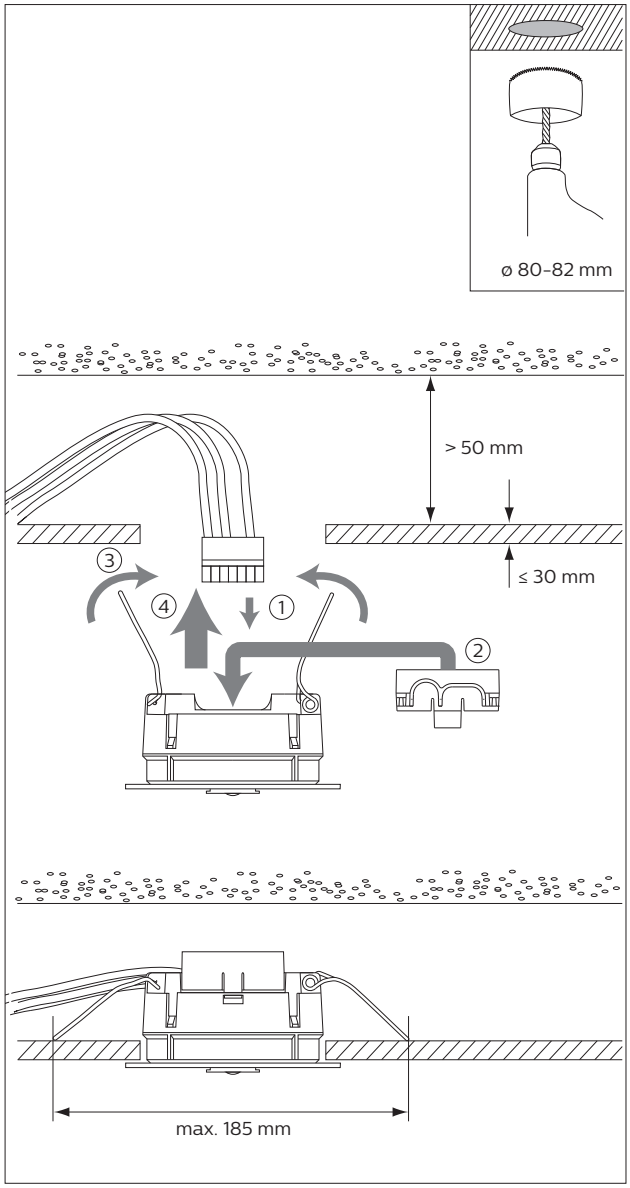
If the shield is retracted the detection pattern will be cut on one side (120°) as indicted in the diagram.

The OccuSwitch DALI detection pattern (see drawing) is 4 by 5 meters for small movements (desk work) and 6 by 8 meters for larger movements like walking.

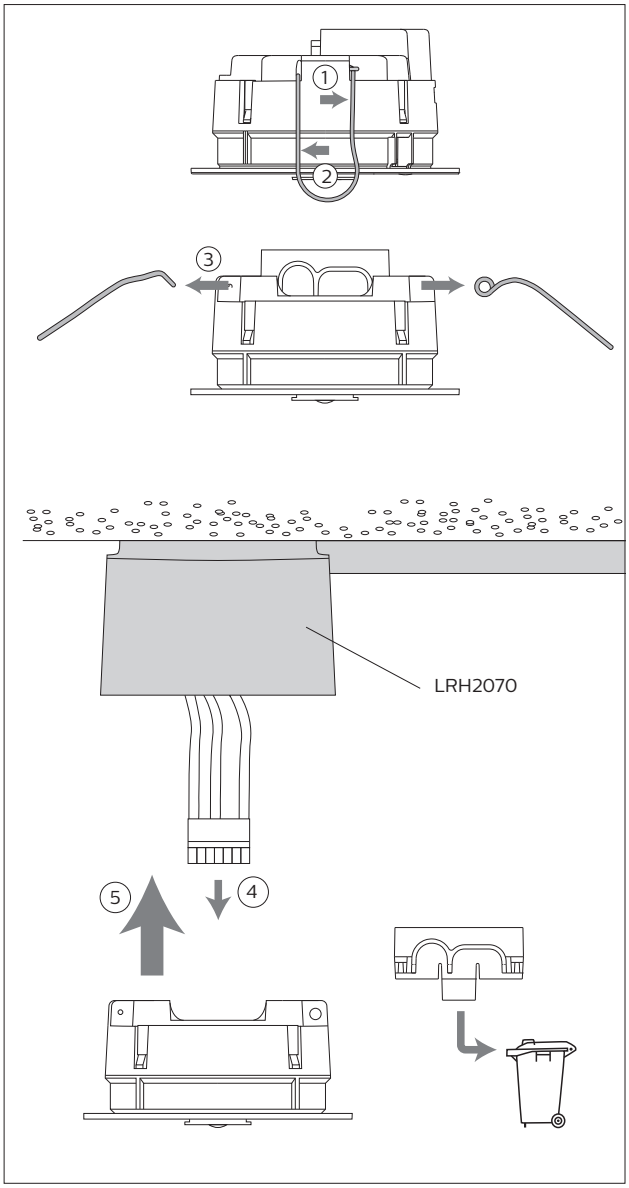
The detection area can be extended by two extension sensors (LRM8118) each with a equal detection pattern.

Mechanical installation

The OccuSwitch DALI can be mounted in two ways; recessed in the ceiling or surface mounted using the ceiling box. The ceiling box (LRH2070) has a breakout port for cable ducts and a breakout centerpiece.



Parallel installation

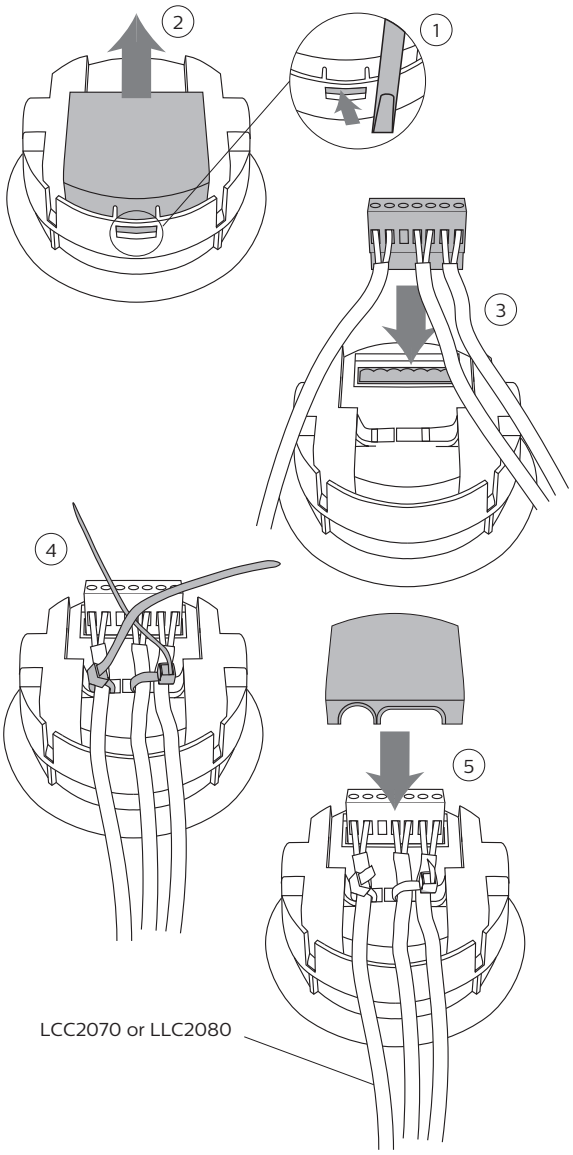


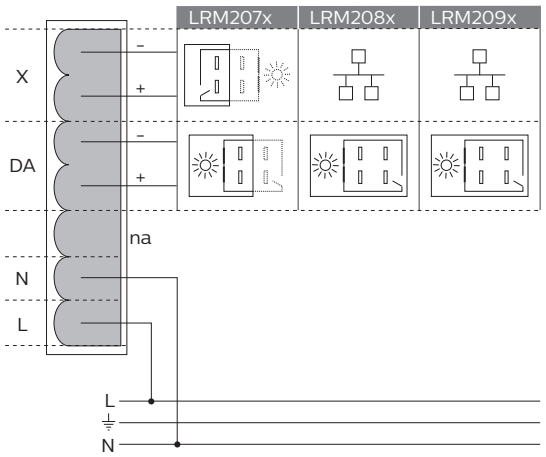
Single installation

Electrical installation

The OccuSwitch DALI can be installed with either conventional wiring or Wieland connectors. For the last option the Wieland cable (LCC2070 or LCC2080) is required. The OccuSwitch DALI comes with a detachable mains connector for easy installation. This connector is removed if the Wieland cable is used. The mains connection is protected by a retractable cover and secured with two tie raps.

The DALI signal from a ballast or luminaire, although low voltage and isolated from mains, cannot be treated as a safe signal (SELV). All wiring and isolation materials used must be similar to mains wiring (FELV). The same applies to the network connection of the LRM2080 and LRM2090.





Commissioning

Desired standard light level

There are three ways to set the light level.

Automated mode

Step 1 Press the OccuSwitch DALI button for 3 seconds until the LEDs start a yellow/green sequence
Step 2 Release and press again, the LEDs will now blink red/green
Step 3 Clear the area beneath the OccuSwitch DALI.
Step 4 Within 10 seconds the auto calibration starts
Step 5 Lights will switch off and on
Step 6 Lights will flash to indicate a successful operation
Step 7 The calibration is finished

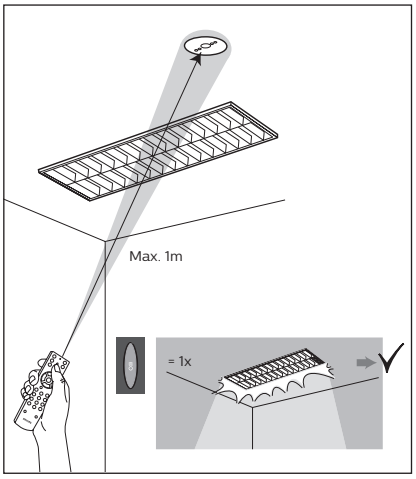
Manual with normal control

Step 1 Use a remote or switch to set the desired light level
Step 2 Press the OccuSwitch DALI button until the LEDs start a yellow/green sequence
Step 3 Clear the area beneath the OccuSwitch DALI
Step 4 The light level existing 10 seconds after step 2 is used as set point
Step 5 Lights will flash to indicate a successful operation
Step 6 The calibration is finished

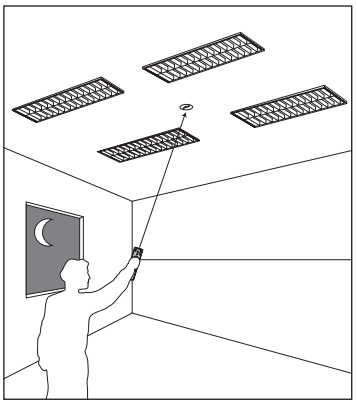
Manual with OmniProg (easy)

Step 1 Use the OmniProg's up an down keys to create the desired light level
Step 2 Press the "SAVE" button
Step 3 The lights will flash once to indicate calibration was successful

IRT8099 commissioning tool



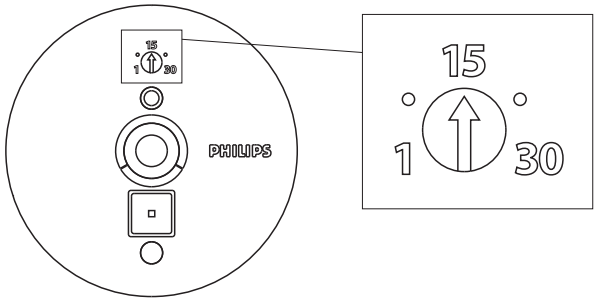
Send command



Calibrate light level

Delay time occupancy control

With the rotary it is possible to select a delay time of either 70s, 5 till 30 min (in steps of 5 minutes).



Rotary

Further commissioning

OmniProg (easy)
The OccuSwitch DALI will acknowledge commissioning commands by flashing the lights.
For detailed information please refer to the manual or www.philips.com/omniprog
The OmniProg tool has a low power and very narrow beam to prevent that neigbouring OccuSwitch DALI units are programmed by mistake. You must be within 3 meters of the device and aim exactly at it.

The following settings are sent all at once with the green SEND button. After selection of the function the red LED on the transmitter will switch on.

Change IR group
Both the OccuSwitch DALI and transmitters can operate in 7 different groups. Both the transmitter and OccuSwitch DALI must be in the same group
Select “group A-G” on the IRT8099, followed by the desired IR group (A-G, buttons 1..7).

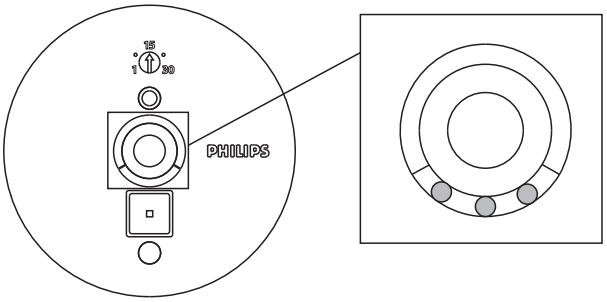
Change power-up behaviour
The OccuSwitch DALI switches the output on when it is connected to the mains. If the area is vacated the lights will switch off after 5 minutes.
It is possible to leave the output off and start movement detection 30 seconds after the mains is connected.
Select “power up on/off” on the IRT8099, followed by either “on” or “off”.

Restore defaults
To restore the default settings aim the IRT8099 towards the OccuSwitch DALI and press on “basics”.

Note
The IRT8099 will send all parameters when the SEND button is pressed.
To erase previous settings press first “basics” on the IRT8099.

Error states
The OccuSwitch DALI is designed to create (if possible) a safe situation if the device itself or its peripherals fail.
Depending on the failure the OccuSwitch DALI will continue “as good as possible” or switch the lights on.
The LED on the device will be always yellow and will not switch off, even if there is no movement or communication detected.
Please refer to the manual for more information and diagnostic flow charts.

LED



Flash Red, Yellow or Green	
Movement or communication detected	*Red = 100 – 70%* *Yellow = 70 – 30%* *Green = 30% - off*
Circulation (long/short) Yellow/Green	
Auto commissioning with current light level	
Red/Green	
Auto commissioning	
Green/Red	
DALI commissioning in progress	
Continuously Green (when lights are on)	
In 100 hours burn in mode (no dimming possible)	
Yellow	
Internal error	
Red	
Short circuit on DALI channel	
Fast sequence Red/Yellow/Green	
Trigger received from parallel unit (LRM2080 only)	

Attention

The OccuSwitch DALI should not be used in the following situations

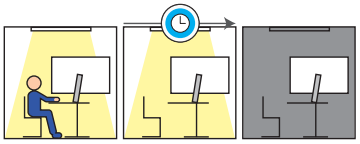
- In applications outside the specification range, most notable heights above 4 meter.
- Environmental conditions other than in a normal office environment (temperature, humidity).
- In applications with heat sources like electrical heaters, within the detection range of the device
- In applications with (semi continuous) IR appliances like IRDA communication, IR communication between PDA and phones and other devices, headsets operating with IR communication, etc. etc. Please note that some devices with IR communication send IR messages, even when there is no active communication link. These features must be disabled.
- In applications with electronic ballasts that operate up or near a frequency of 36 Khz. Also when these ballasts are not used in combination with the device, but the light from the lamps they operate is visible to the IR receiver.

OccuSwitch DALI Modes

The OccuSwitch DALI is set, by default, with a generic set of parameters for a standard office. But it is possible to recall 8 other application (specific cell, open plan or meeting room) modes as mentioned below.
This makes the system very flexible for all different kinds of applications. With the aid of the advanced mode selection tool IRT8099 specific modes can be selected. Once selected, the mode can be stored and copied via a point and shoot method. The mode will be stored in a non-volatile memory. Even when the luminaires are switched off for a longer period, stored parameters are kept.
The modes are compatible with the Actilume system's modes, except for modes 4 and 5.

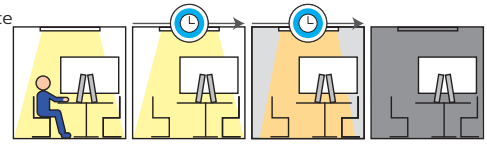
Mode 1
Cell office

Auto on



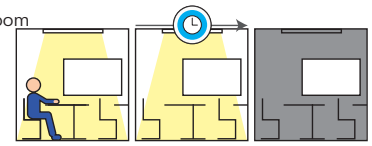
Mode 2
Open plan office

Auto on

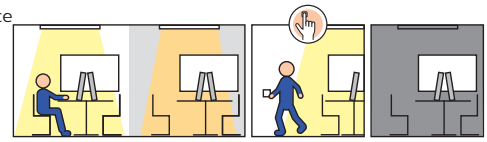


Mode 3
School, classroom

Auto on



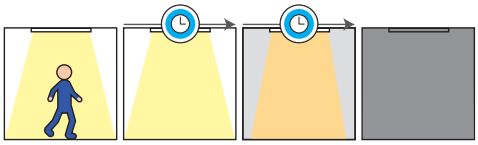
Mode 4
Open plan office
Comfort mode
EN 12464



Mode 5
Cell office
Comfort mode
EN 12464

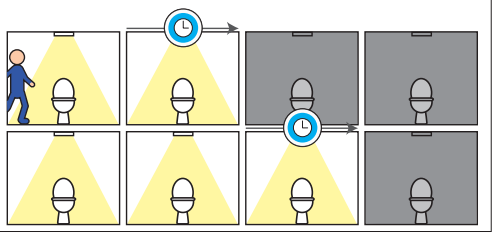
Mode 6
Corridor

Auto on

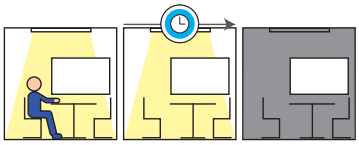


Mode 7
Toilets

Auto on
DDR off

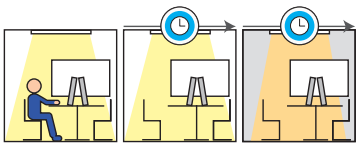


Mode 8
Meeting rooms



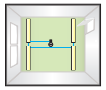
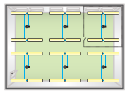
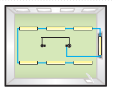
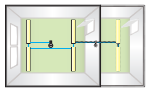
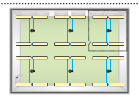
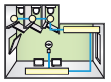
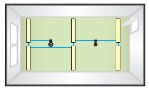
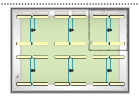
Mode 9
Open plan
Always light

Auto on



Mode 10
Open plan
Comfort mode, always light

Custom mode

Mode	Application	Occupancy	Smart timer (minutes)	Background period (minutes)	Daylight override	Daylight dependent regulation	Daylight dependent switching	Parallel link period (Advanced only)
1	 Cell office (default)	Auto ON/OFF	10	0	Window only	Window / corridor	Window only	Local occupancy
2	 Open plan office	Auto ON/OFF	10	120	Window only	Window / corridor	Window only	Local occupancy
3	 Class room	Manual ON/auto OFF	10	0	N.a.	Window / corridor	Window / corridor	Local occupancy
4	 Cell office*	Disabled	10	0	N.a.	Window / corridor	Window only	N.a.
5	 Open plan*	Disabled	10	0	N.a.	Window / corridor	Window only	N.a.
6	 Corridor	Auto ON/OFF	10	60	Window / corridor	Window / corridor	Window / corridor	Local occupancy
7	 Toilets	Auto ON/OFF	0	15 (portal only)	Disabled	Disabled	Disabled	Local occupancy
8	 Meeting room	Manual ON/auto OFF	10	0	Disabled	Window / corridor	Window only	Local occupancy
9	 Open plan office**	Auto ON/OFF	10	Infinite	Window only	Window / corridor	Window only	Background lighting
10	 Custom	N.a.	N.a.	N.a.	N.a.	N.a.	N.a.	N.a.

* Equals mode 1 and 2, but without MD active. Do not use these modes for normal applications.

** This mode works differently in the advanced (LRM2080) version. Here the lights will switch off (the basic never switches off) when none of the advanced OccuSwitch DALI units in the parallel network detect movement. If one, or more, do detect movement all other units will go to background level.

Warnings

Safety

The OccuSwitch uses DALI or DALI like signals to communicate to other devices, ballasts or BMS systems. The interfaces (DA and X) on the OccuSwitch DALI are double isolated from mains (SELV). However most DALI devices (like ballasts in luminaires) only provide basic isolation between mains and DALI. If these devices are used all interface wiring (also on the X network) should be treated as FELV (so mains wiring isolation is required).
We strongly recommend to always use cabling with mains rated isolation to prevent potential unsafe installations.

Short circuit and protection

The DA (all units) and X (LRM2070 and 2080) interface provide DALI (or other) power in order to be able to communicate. These interfaces are protected against a short circuit if used within specification.
External power (DALI) supplies should only be used on the BMS DALI network of the LRM2090. The use of more than 22 LRM2080 in parallel can cause severe damage to the output circuit.
Only the network (X) interface of the LRM2090 has further protection. Other interfaces (DA or X (LRM2070 and 2080)) will be damaged beyond repair if mains power is connected. Although safe, smoke and a strong smell can occur if this happens.

Parallel mode

The LRM2080 OccuSwitch DALI advanced supports parallel mode for occupancy control. This means that the separate units have their own daylight depending and local control and their own settings. Only the MD signal from neighboring units is shared. This means that lights will stay on if one of the connected systems detects movement. Lights will stay on and only switch off, or go to background level when the last MD timer in the group elapses.
Exception to this rule is mode 9. The parallel link is refreshed every 60 seconds. So when movement is detected a signal will be given, than after 60 seconds again, and again, until de timer elapses. This signal is visible on the unit.

Specifications

Environmental conditions	
Storage conditions	
Temperature	-20 to 70 °C
Relative humidity	20 to 90%; no condensation
Operating conditions	
Temperature	5 to 50 °C
Relative humidity	20% to 90%; no condensation

Mains connection	
Voltage	230 VAC +/10%; 50/60Hz
Stand-by power	<1 W (Without DALI load)
Max power	2.4 W (with 15 ballasts)
Connector screw terminal	MRT3P7.62-3VE or GMVSTBW2.5/3-ST-7.62
Wire range	0.5 to 2.5 mm^2 **Note** Wires must be >= 0.5 mm^2
Mains distribution system	TN-S, 16A max, with Neutral grounded
Power consumption	Stand-by 1.2 W Max. 1.2 W
Parallel interface (LRM2080 only)	Up to 22 units in parallel Free Topology Wiring Polarity sensitive
BMS interface (LRM2090 only)	Hardware DALI compatible Reduced DALI command set Up to 64 units in parallel (depending on control device used as master) Free Topology and polarity
LED indicators	see text
Switch off delay	1,5,10,15,20,25,30,35* minutes * OmniProg only
Light levels	250 to 1000 Lux (30% reflection)
Detection range	see diagram (IR remote is similar)
Light sensor	see diagram

DALI interface	
Protocol	Bi phase coded according to EN60929 Extend annex E Network polarity Polarity insensitive
Load capacity	Maximum 15 DALI devices per output
Protection	Interface is short circuit proof
Transmission rate	Max. 1200 bits per second
DALI voltage	11.5 Vdc to 15 Vdc
Connector type	Wieland BST 14i2; blue
Standards	EN/IEC 60669-2-1 Electronic switches
Classification	Class I
Pollution	degree 2
Over voltage	category III
Approbation	Product complies with the relevant European Directive (CE) KEMA
Protection Class	IP20
Flammability	UL94 V-0
Glow wire test	960 °C / 5 s
Insulation	Double insulation (4kV) between Mains and SELV
EMC	
Compliance IEC	(EN) 60669-2-1
Immunity IEC	(EN) 61547
Emission IEC	(EN) 55015 and IEC (EN) 55022, class B

CE

Packing data

Type	Box dimensions	Qty	Material	Weight net	Weight gross
LRM2070	105 x 95 x 58 mm (4.1 x 3.7 x 2.3 in)	1	card board	0.12 kg (0.26 lb)	0.15 kg (0.33 lb)
LRM2080	105 x 95 x 58 mm (4.1 x 3.7 x 2.3 in)	1	card board	0.12 kg (0.26 lb)	0.15 kg (0.33 lb)
LRM2090	105 x 95 x 58 mm (4.1 x 3.7 x 2.3 in)	1	card board	0.12 kg (0.26 lb)	0.15 kg (0.33 lb)
LCC2070		1	plastic bag	0.13 kg (0.29 lb)	0.14 kg (0.3 lb)
LCC2080		1	plastic bag	0.13 kg (0.29 lb)	0.14 kg (0.3 lb)
LRH2070	105 x 95 x 58 mm (4.1 x 3.7 x 2.3 in)	1	card board	0.05 kg (0.11 lb)	0.08 kg (0.18 lb)
IRT8097	131 x 58 x 87 mm (5.2 x 2.3 x 3.4 in)	1	card board	0.06 (0.13 lb)	0.09 kg (0.2 lb)
IRT8099/10	168 x 45 x 22,5 mm (6.6 x 1.8 x 0.9 in)	1	card board	0.03 (0.06 lb)	0.10 kg (0.22 lb)

Ordering Data

Type	MOQ	Ordering number	EAN code level 1	EOC
LRM2070 Basic	1	9137 003 32903	87 11559 732282	732282 99
LRM2080 Advanced	1	9137 003 33003	87 11559 732329	732329 99
LRM2090 BMS	1	9137 003 33103	87 11559 732367	732367 99
LCC2070 Wieland cable for LRM2070	1	9137 003 33703	87 11559 732497	732480 99
LCC2080 Wieland cable for LRM2080-90	1	9137 003 33803	87 11559 732510	732503 99
LRH2070 Surface Box	1	9137 003 33903	87 11559 732534	732527 99
OmniProg IRT8097 Easy	1	9137 003 34103	87 11559 732558	732541 99
OmniProg IRT8099/10 Standard	1	9137 003 34203	87 11559 732572	732565 99