# PUTTING A STOP TO ENERGY WASTE

## LIGHTING MANAGEMENT SENSORS

DESIGN AND APPLICATION GUIDE

CATALOGUE PAGES INSIDE →

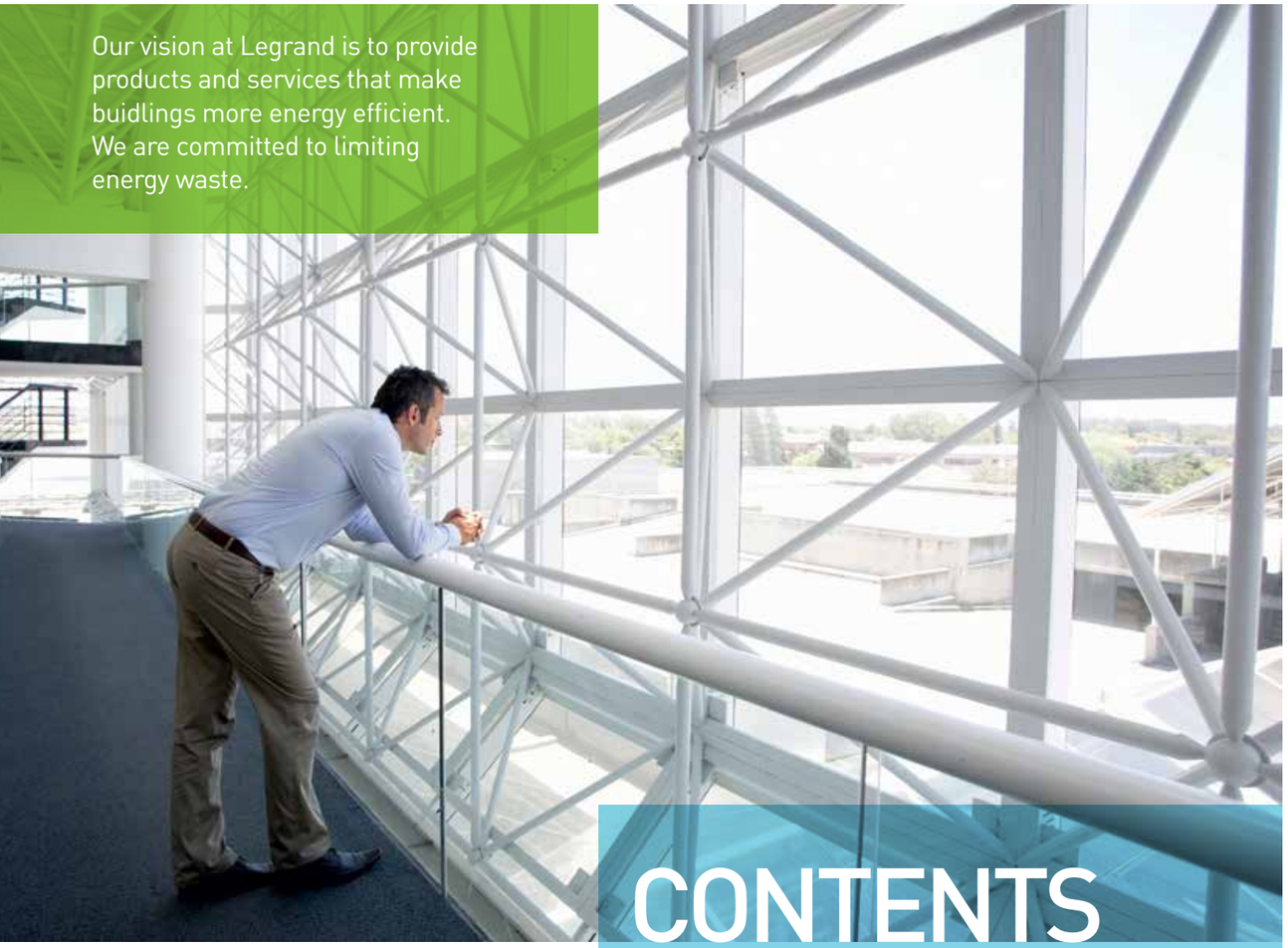
THE **GLOBAL SPECIALIST**
IN ELECTRICAL AND DIGITAL BUILDING INFRASTRUCTURES

legrand®

SAVINGS
60%
according to EN 15193

This document will assist you in selecting, laying out, commissionning and installing a lighting management solution. It will also assist you in defining and implementing the optimum lighting management solution for a specific type of building space.

Our vision at Legrand is to provide products and services that make buidlings more energy efficient. We are committed to limiting energy waste.



# CONTENTS



# DESIGN STEPS FOR IMPLEMENTING

## MOTION AND LIGHTING MANAGEMENT SOLUTIONS

Our wide range of switch sensors, comprising of motion and lighting management sensors, is designed to reduce the amount of time lighting is left on active unnecessarily, for example when an area is unoccupied or if there is sufficient natural light.

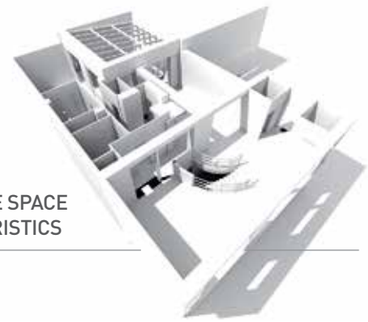
Our lighting management sensors can be used to:

- **monitor the detection area for occupancy**
  When a person is sensed the lighting is automatically switched on.

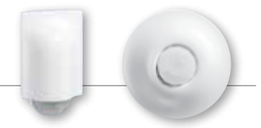
  In case of sensors equipped with a built in light level sensor, the lighting will be kept off when enough natural light is available.

  When the area is vacated the lighting is switched off after a preset time delay.
- **control lighting** (up to 60% savings on lighting energy costs according to EN 15193).
- **control HVAC circuits and roller blind circuits** (either via the sensor or a room controller).

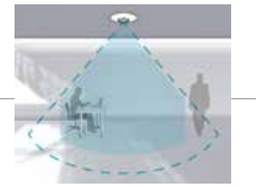
**The Legrand range includes motion or lighting management sensors to suit any area and control your lighting efficiently.**



1 ASSESS THE SPACE CHARACTERISTICS



2 CHOOSE THE RIGHT SWITCH SENSOR



3 DEFINE THE BEST LOCATION

4 CONFIGURE THE SENSORS

STEP 1

# ASSESS
## THE SPACE CHARACTERISTICS

There is a dedicated solution for each area (such as type, configuration, activity). Therefore it is essential to take the following criteria into account:

- room/space size and shape (number of m²)
- occupant activity and non-activity areas
- location of walls, doors and windows
- partition height and location
- ceiling height
- areas benefiting or not benefiting from natural light
- location of shelves, book cases, filing cabinets and large equipment
- large objects that could block or alter a sensor's coverage
- location of HVAC ducts and fans
- location of desks/workspaces – orientation with regard to walls, partitions and other obstacles.

To ensure a perfect installation of the sensors and the best quality detection, here are some application examples:










**Special attention should be paid to high levels of vibration and/or air flow, extreme temperature conditions, and unusually low levels of activity as these issues may help identify the best technology solution**

STEP 2

# CHOOSE
## THE RIGHT SENSOR

Legrand has 2 sensor categories based on the area and the type of detection:

**MOTION SENSORS:**

- for areas with little or no natural light.
- for passageways.
- automatic on/off switching according to whether or not an area is occupied.
- can be manually adjusted with trim pots

**LIGHTING MANAGEMENT SENSORS:**

- for areas with natural light.
- for passageways and/or work areas.
- manual or automatic switch-on and automatic switch-off, according to whether or not area is occupied and the natural light level.
- dimming and HVAC/roller blind control for BUS sensors used with controllers.
- can be adjusted using a remote configuration tool.

## MOTION SENSORS

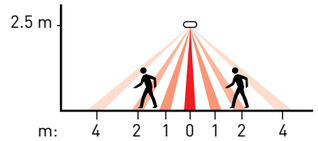
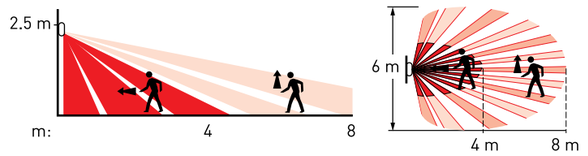
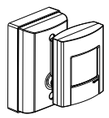
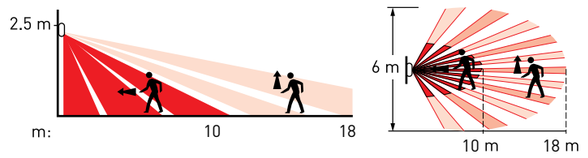
**For areas with no natural light**

These sensors are particularly suitable for areas where there is no natural light, such as passageways, bathrooms, corridors and equipment rooms.

### 1 DETECTION TECHNOLOGY:

**Passive Infrared (PIR) technology**
PIR technology detects occupancy by reacting to infrared energy sources, such as a human body in motion.

### 2 COVERAGE PATTERNS - MOTION SENSORS

| Cat.Nos | Installation type Technology | Range | Detection area | Examples of applications |
|---|---|---|---|---|
|  488 03 |  | 8 m |   | Corridor, stairways, restrooms etc. |
|  489 11 |  | 8 m |   | Corridor, stairways, restrooms (IP 42) |
|  489 11 |  | 18 m |   | Utility room, car park, cellar (IP 55) |

# LIGHTING MANAGEMENT SENSORS

**For areas with natural light**

These sensors are particularly suitable for areas and buildings with natural light, such as: shops, offices, healthcare buildings, recreation areas, warehouses or workshops.

The lighting management sensors have built-in adjustable lux sensors:

- which will keep the lighting switched off if there is sufficient natural light
- when associated with room controllers will dim automatically while maintaining a pre-set lux level according to natural daylight and will control several lighting and ventilation circuits.

## 1 DETECTION TECHNOLOGY

**Passive Infrared (PIR) technology**
PIR technology detects occupancy by reacting to infrared energy sources, such as a human body in motion.

**Dual technology (DT)**
Sensors that employ PIR + US sensing technologies are usually referred to as "dual technology".
Our dual technology ensures maximum sensitivity and coverage in tough applications for optimum reliability and energy saving.

## 2 PRODUCT FEATURES

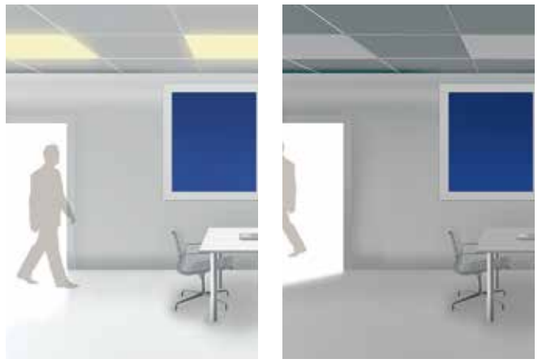
### 2-1. Occupancy and vacancy detection

**Vacancy/occupancy mode selection**
Most Legrand sensors can work using occupancy mode (by default) or vacancy mode.

Occupancy mode means that lights are automatically switched on or off according to occupancy.

Vacancy mode means that lights are manually switched on and automatically switched off.
Vacancy mode offers extra energy savings.

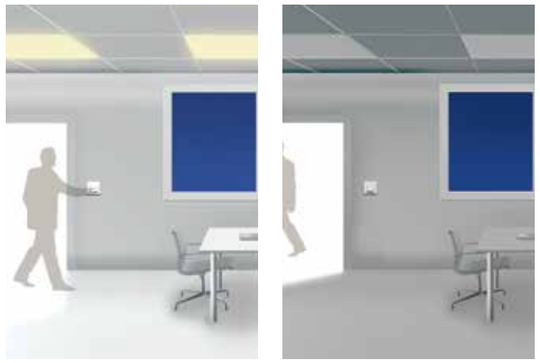
### OCCUPANCY MODE



Sensors will automatically switch lighting on when a person enters the room, and automatically switch lighting off when no movement is detected.

**Application:**
- energy saving and cost effective, can be used instead of a conventional switch.

### VACANCY MODE

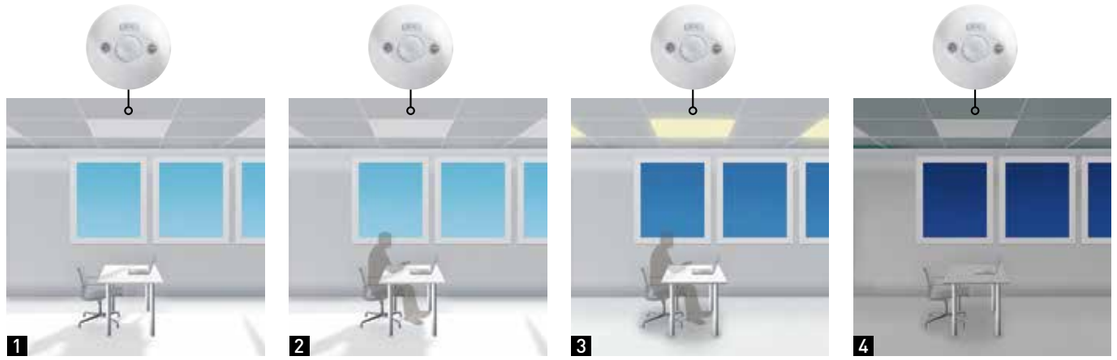


Upon entering a room the person switches on the light as manually, but on leaving the sensor automatically switches off the lighting. Lights can also be switched off manually.

**Application:**
- commonly used for improved energy saving and to comply with regulations.

### 2-2. Daylight

**Daylighting set point = Regulation**
The light level feature keeps the lighting OFF when natural light levels rise above a pre-set level. This setting is adjustable and can be overridden. This function is enabled by default.



1 No presence detected, daylight, lights off

2 Presence detected, sufficient daylight, lights off

3 Presence detected, insufficient daylight, all lights on

4 No presence detected, lights off

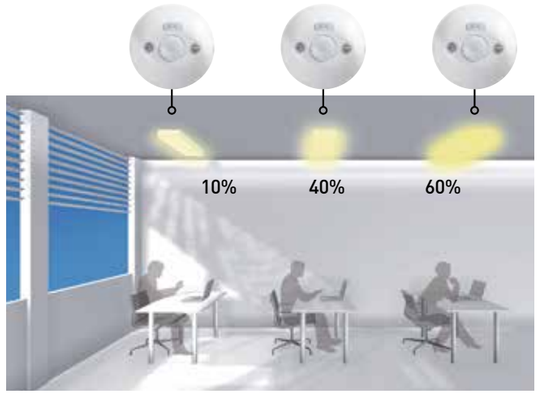
## 3 COMBINATION: NETWORK SENSOR AND ROOM CONTROLLERS

Sensors can be combined with a room controller to manage a number of circuits in passageways, outdoors, damp areas or in work areas with natural light.

Combining a sensor and a room controller provides additional functions:

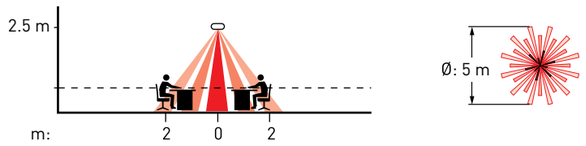
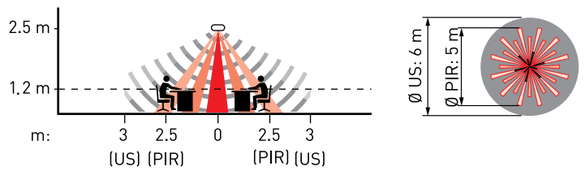
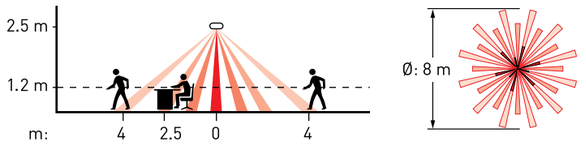
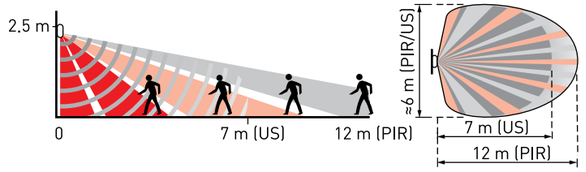
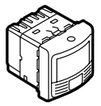
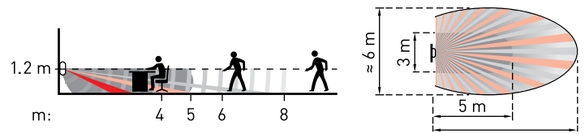
- lighting management: on-off or dimming (DALI, 1-10 V, halogen/incandescent/LED).
  Eg: dimming the window side (access to natural light) and the corridor side separately.
- your installation: such as blinds, heating and fan control.

This combination provides a flexible building and more energy savings.




**The daylight is unevenly distributed in an area**
A sensor is combined with each row of luminaires and measures presence and light level.
The dimming controller regulates each row of luminaires and supplements the external light to obtain the required light level.

## 4 COVERAGE PATTERNS - LIGHTING MANAGEMENT SENSORS

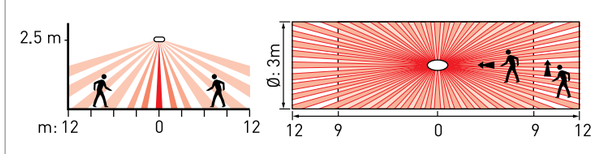
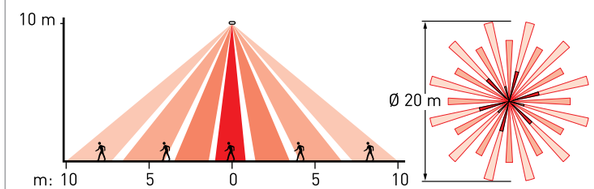
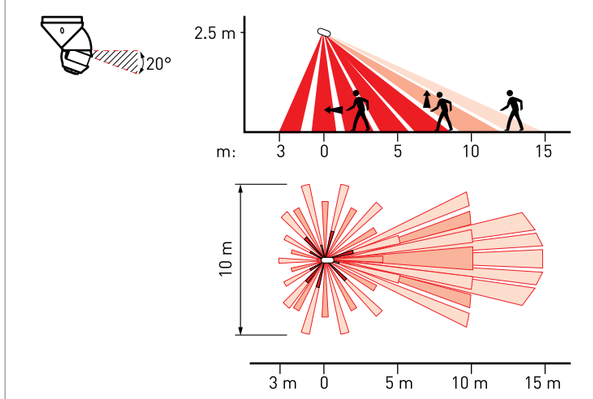
| Cat.Nos | Installation type Technology | Range | Detection area | Examples of applications |
|---|---|---|---|---|
|  488 04[1] |  | 5 m |   | Individual office, corridor, stairways, restrooms etc. |
|  488 06 |  | 6 m (US)<br>5 m (PIR) |   | Classroom, meeting room, open plan office |
|  488 07 |  | 8 m |   | Hall, stairways etc. |
|  489 16[1] |  | 7 m (US)<br>12 m (PIR) |   | Individual office, classroom, meeting room, restrooms etc. |
|  0 784 52 |  | 8 m |   | Individual office, classroom, meeting room, open plan office |

**Passive Infrared (PIR) technology**

**Dual technology (DT)**

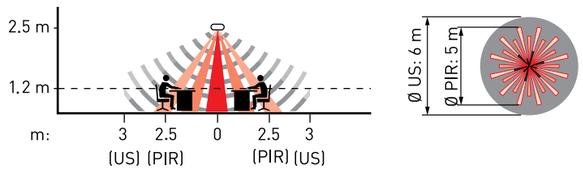
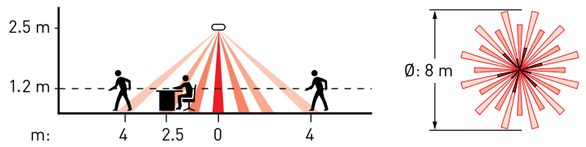
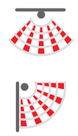
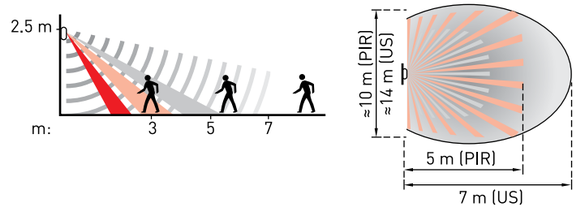
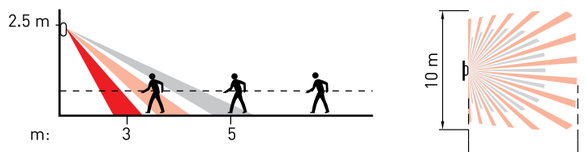
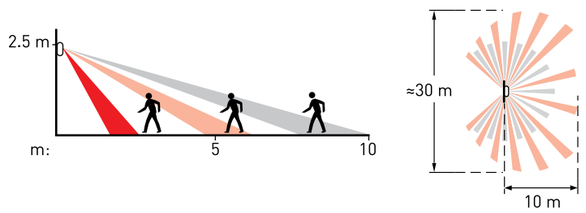
[1] 1 lighting output & 1 fan output

[2] without neutral

| Cat.Nos | Installation type Technology | Range | Detection area | Examples of applications |
|---|---|---|---|---|
|  488 17 |  | 2 x 12 m |   | Long corridor |
|  489 32 |  | Ø 20 m |   | High ceiling areas (Warehouses, gymnasium) |
|  489 33 |  | 18 m |   | High ceiling areas (Warehouses, gymnasium) outdoor car park, cellar, laboratory |

[1] 1 lighting output & 1 fan output

## 4 COVER PATTERNS - NETWORK SENSORS AND ROOM CONTROLLERS

| Cat.Nos | Installation type Technology | Range | Detection area | Examples of applications |
|---|---|---|---|---|
|  488 22 |  | 6 m (US) 5 m (PIR) |   | Individual office, classroom |
|  488 20 |  | 8 m |   | Restrooms, changing room |
|  488 23 |  | 7 m (US) 5 m (PIR) |   | Individual office, classroom |
|  488 24 |  | 5 m |   | Restrooms, changing room |
|  488 30 |  | 10 m |   | Outdoor car park, cellar, laboratory, test rooms |

## 5 ROOM CONTROLLERS

In order to control several circuits (lighting, fans, blinds), lighting management sensors can be used with room controllers.

The following chart indicates which room controller to use:

| | ON-OFF | DIMMING | | |
|---|---|---|---|---|
| | | DALI | 1-10 V | HALOGEN - INCANDESCENT - DIMMABLE LEDS [1] |
| **1 lighting circuit in the same room** | 488 50 | 488 51* | - | 488 45 |
| **1 lighting circuit + fan output in the same room** | 488 50 | 488 51* | - | - |
| **2 lighting circuits in the same room** | 488 50 | 488 51* | - | 488 45 |
| **2 lighting circuits + 1 fan output in the same room** | - | 488 51* | - | - |
| **2 lighting circuits** (2 inputs, 2 outputs) **in 2 rooms** | 488 41 | - | 488 42 (1000 VA) | 488 45 |
| **4 lighting circuits** (4 inputs, 4 outputs) **in 4 rooms** | - | 488 44 (max. 32 ballasts) | 488 43 | - |

[1] Refer to the load table in the data sheet available (**Note:** some commercially available dimmable LEDs are not compatible).

* Available 2015

STEP 3

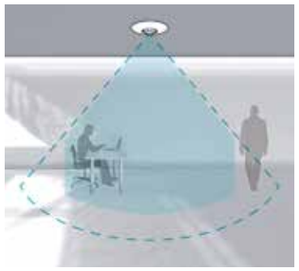
# DEFINE THE BEST LAYOUT

Whether it is in work areas or passageways, the presence sensors must be chosen and positioned in line with the following recommendations:

## 1 WORK AREAS

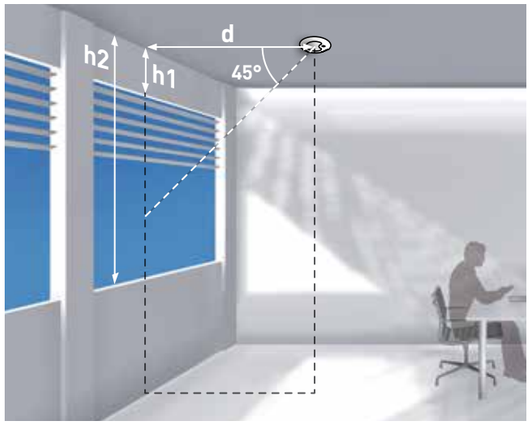
These are areas in which people spend time, such as individual or open plan offices, meeting rooms, classrooms.

**Positioning**
For optimum detection, the sensor must have an unobstructed view (no obstacles in the sensor's detection range).



People who are seated must be completely within the area to be monitored, and preferably as close as possible to the sensor (the detection area for seated people is much smaller than that for people who are moving around).

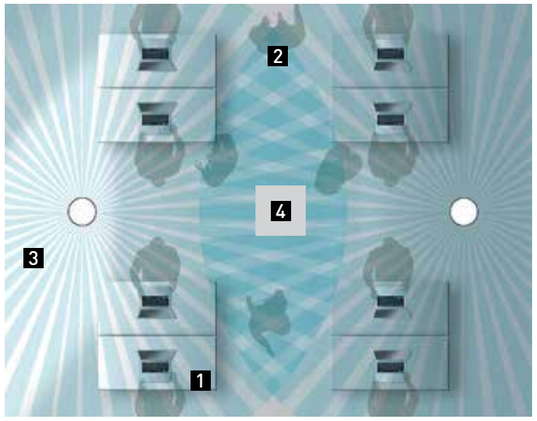
In small spaces preference should be given to wall-mounted sensors placed in a corner. In large, open plan offices preference should be given to ceiling sensors (with their detection areas overlapping).




For optimum light level measurement, the sensor must be positioned between a minimum distance (to be determined) and 4 metres maximum from the source of natural light (such as large or small window). The ideal distance is calculated using the formula **d= (h1+h2)/2)**.

**Recommendations**
The presence sensors must not:

- be positioned less than 1m from sources of heat or cold (such as radiators, air conditioning units) which could cause "false detection"
- have a luminous flux (luminaire, window) in direct view, to ensure correct measurement of the light level.




1- Seated person
2- Moving person
3- Window
4- Air conditioning unit

**Dual technology detection** should be given preference as it combines 2 detection technologies (IR + US), providing reliable detection of people who are seated.

## 2 PASSAGEWAYS

These are areas in which people "move around", such as corridors, halls, stairways, archive areas, toilets, etc.

**Positioning**
For optimum detection, the sensor must have an unobstructed view (no obstacles in the sensor's detection range).
The following types of presence sensors can be used:

- wall mounted, with an 180° detection area
- ceiling mounted, with long range detection areas.

To avoid any blind spots the detection areas in horizontal or vertical spaces, where people move around, must overlap.

The transverse detection performance is more important than the radial performance.

**Recommendations**
Access points (such as doors) must be fully covered by the detection areas.
To ensure correct measurement of the light level the sensors must not have any luminous flux (luminaire, window) in direct view.

**PIR detection** should be given preference. It provides good detection performance for people moving around, with a long detection range.

STEP 4

# CONFIGURE
## THE SENSORS

Lighting management sensors are factory pre-set. The configuration tool, Cat.No 882 30, can be used to configure the sensors with customised settings by sending and receiving data via infrared, easy set-up and maintenance guaranteed! The following functions can then be adjusted:

**Time delay**
Each time there is a movement, a time delay – or inner clock – is restarted. The light stays on until this time delay has elapsed, as the room is considered to be occupied.
**Recommendation:**
10 to 15 minutes for work areas, 5 minutes for passageways.

**Daylight setpoint**
Value at which the load comes on if light level is below the light setting and goes off if it is above this threshold. The Daylight setpoint can be set up to a maximum of 1275 lux.
**Recommendation:**
passageway and corridors: 100 lux
stairways: 150 lux
offices: 300 - 500 lux.

**Sensitivity**
For each technology, the sensitivity setting is used to:
- reduce or increase the detection area
- reduce the effects of air currents, air conditioning and air flows from heating.

To set the sensitivity levels, go to the detection area and check that the sensor covers the strategic positions in the room (entrance door, desk).

**Calibration**
In order to set this calibration, it is necessary to measure the surrounding light level using a luxmeter beforehand. The surrounding light level measured must then be transmitted to the sensor.

**Steps for regulating the electric light factor:**
- switch the light on and close the blinds
- wait 2 minutes
- measure the light level below the cell using a luxmeter.

Enter this value in the tool and send it to the cell. This calibration will be acknowledged during the next detection cycle.

### 4 DIFFERENT OPERATING MODES

**Occupancy (Auto on/Auto off mode)**
Automatic switch-on:
- detection of presence if there is an insufficient natural level of light.

Automatic switch-off:
- if no presence is detected and at the end of the time delay set
- if there is a sufficient level of natural light (activated light regulation).

Any new detection causes an automatic switch-on if there is insufficient light.

**Walk through**
- If there is no presence detected in the 20 seconds following an initial detection, the sensor will switch off after 3 minutes.
- If a new presence is detected in the 3 minutes following the initial detection, the device will switch off at the end of the time delay set.

**Vacancy (Manual on/Auto off mode)**
Manual switch-on, automatic switch-off:
- where no presence is detected and at the end of the time delay set.

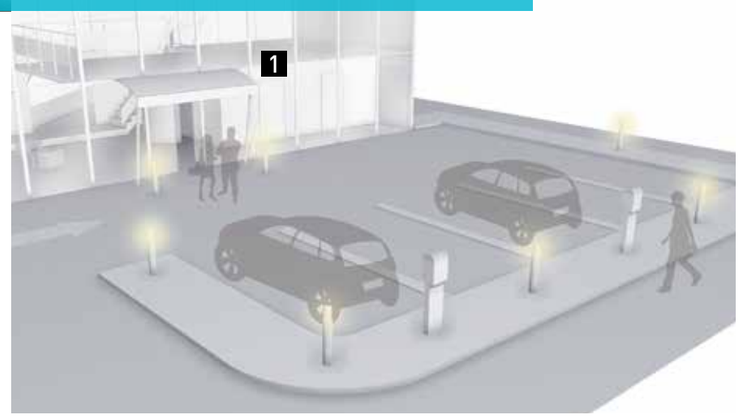
Following switch-off, any new detection within a 30-second period will cause the device to be switched on automatically. After 30 seconds, the device is switched on via a manual switch.

**Partial on/Group off mode**
This mode is used to ungroup circuits that are switched on through detection and switched off at the end of detection. Example: on detection the main lighting is switched on and occasional lighting can be controlled manually at the same time. At the end of detection, the sensor orders the main lighting and the occasional lighting circuits to be switched off.

**MOBILE CONFIGURATOR:**
FOR SET-UP AND MAINTENANCE


# APPLICATION EXAMPLES
## FOR SPECIFIC BUILDING SPACES

# Outdoor parking




Switch-on and switch-off must be automatic according to whether or not the area is occupied and the natural light level.
The sensor must withstand outdoor stresses.

## CONTROL REQUIREMENTS

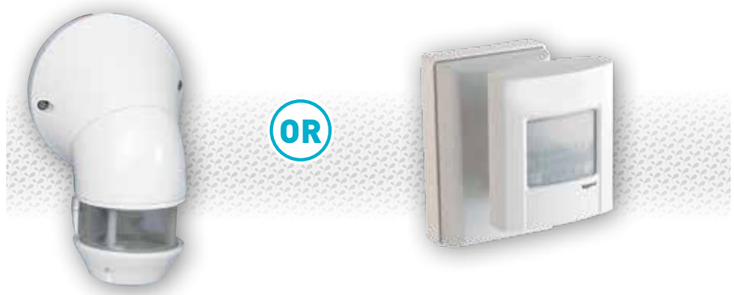
Lighting is automatically switched ON & OFF.

**Switch-on**
Automatic through presence detection as soon as the natural light level is insufficient.

**Switch-off**
Automatic when the area is no longer occupied after a time delay, or as soon as the natural light level is sufficient.

## SOLUTIONS

**1** Use PIR sensors to provide a large coverage area in terms of length and width.




**Cat.No 489 33**
PIR outdoor motion sensor
Its double lens will switch on the lights as soon as the door opens. It will also provide detection over very long areas.
- 270° with directional head
- Range 15 m
- IP 55 Weatherproof rating
- Wall or ceiling mounted
- Programmable with mobile configurator

**Cat.No 488TRI3W**
Triscan (PIR, microwave and photoelectric) outdoor motion sensor suitable for all outdoor areas.
- 120°
- Range 18 m
- IP 66 Weatherproof rating
- Wall or ceiling mounted
- Manual adjust (trim pot)

# Warehouse high bay


Switch-on and switch-off must be automatic according to whether or not the area is occupied and the natural light level.
The sensor must have a detection range suitable for very high areas.

## CONTROL REQUIREMENTS

Lighting is switched ON & OFF automatically.

**Switch-on**
Automatic through presence detection.

**Switch-off**
Automatic when the area is no longer occupied after a time delay, or as soon as the natural light level is sufficient.

## SOLUTIONS

**1**

**Cat.No 489 32**
PIR sensor
- 360°
- Range Ø 20 m at 10 m height
- IP 55 Weatherproof rating
  (IP 66 with plastic cable glands not supplied)
- Surface mounting on ceiling

# Stairway

Switch-on must be triggered by a person passing and switch-off must be automatic after time delay has elapsed.

## CONTROL REQUIREMENTS

Lighting switched ON & OFF automatically with a motion sensor installed on each floor.

**Switch-on**
Automatic through presence detection as soon as the natural light level is insufficient.

**Switch-off**
Automatic when the area is no longer occupied, after time delay.

## SOLUTIONS

**Cat.No 488 03**
PIR indoor motion sensor
- 360°
- Range Ø 8 m
- Auto ON/OFF
- Manual adjustment (trim pot)
- Ceiling mounted

# Corridors


Switch-on must be triggered by a person passing and switch-off must be automatic after time delay has elapsed, but only if there is insufficient natural light.

## CONTROL REQUIREMENTS

Lighting is switched ON & OFF automatically.

**Switch-on**
Automatic through presence detection as soon as the natural light level is insufficient.

**Switch-off**
Automatic when the area is no longer occupied after a time delay, or as soon as the natural light level is sufficient.

## SOLUTIONS

**1** Use PIR corridor sensors to provide long range front detection and ensure the detection areas overlap so that occupants are not left in the dark.


**Cat.No 488 17**
Infrared dual detection sensor
- 2x180°
- Side range 2 x 12 m
- IP 20 Weatherproof rating
- Ceiling mounted

**Cat.No 488 07**
PIR sensor
- 360°
- Range Ø 8 m
- IP 20 Weatherproof rating
- Surface mounted on a wall can be mounted in/on a corner using accessory

Using 100 lux and a 5 minute time delay will provide the right level of lighting and maximum energy savings.

**For installation of 2 circuits:**
**1/3 luminaires are permanent, controlled by a timer, the other 2/3 are controlled by motion sensors**

# Individual office


Switch-on and switch-off must be automatic according to whether or not the office is occupied and the natural light level.

## CONTROL REQUIREMENTS

Lighting and fan are switched ON manually and switched OFF automatically or manually.

**Switch-on**
Manual via push-button.

**Switch-off**
- As soon as the natural light level is sufficient.
- Automatic through detection that there is no-one present in the office (after time delay).
- Manual using the push-button.

## SOLUTIONS

**1** Use dual–tech sensors to provide precise detection and avoid false switch-off.


**Cat.No 488 06**
Dual-tech sensor
- 360°
- Range Ø 8 m
- Manual ON-Auto OFF Daylight control
- IP 20 Weatherproof rating
- Ceiling mounted

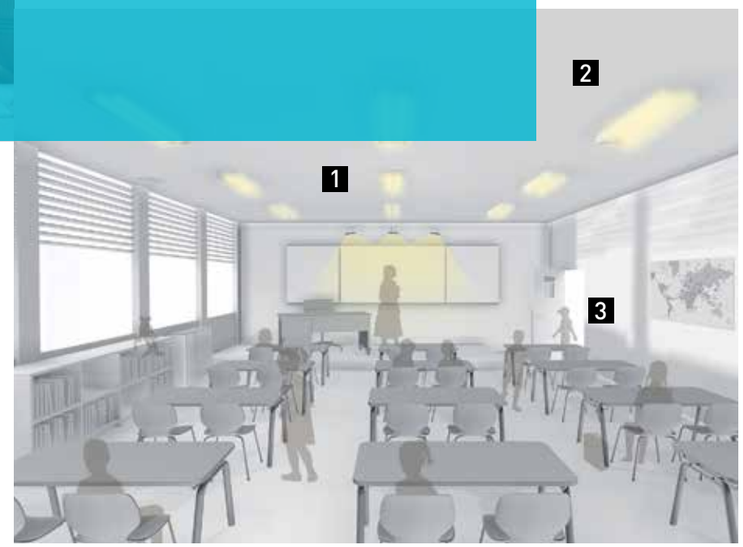
**Cat.No 784 52**
Dual-tech sensor
- 180°
- Maximum range 8 m
- Manual ON-Auto OFF Daylight control
- IP 20 Weatherproof rating
- Wall-mounted

**Cat.No 488 04**
PIR sensor
- 360°
- Range Ø 8 m
- Manual ON-Auto OFF Daylight control
- Fan control relay
- IP 20 Weatherproof rating
- Ceiling mounted

**2** The push-button **Cat.No 5 720 31** can be used to control lighting circuits manually.

**Using 350 lux and a 10 minute time delay combined with Vacancy detection will ensure maximum energy savings.**

# Classroom




The lighting is dependent on whether the areas are occupied and on differences in the natural light level in the classroom.
An additional manual control can be used to dim the lighting.

## CONTROL REQUIREMENTS

Lighting is switched ON manually and switched OFF automatically or manually.

**Switch-on**
Manual via push-button for the room and the board.

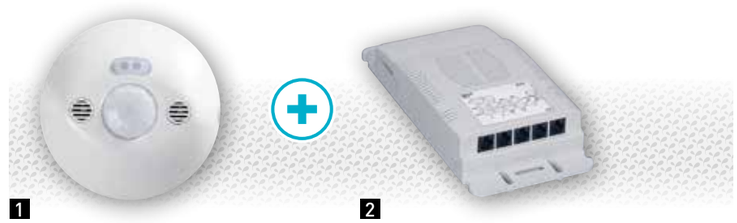
**Switch-off**
- As soon as the natural light level is sufficient.
- Automatic when the area in the classroom is no longer occupied, after a time delay. Automatic switch-off of the board lighting is linked to the classroom lighting.
- Manual using the push-button.

**Lighting regulation**
The amount of artificial lighting is adapted according to the natural light, so that a minimum lighting level is constantly maintained.

Note: users can adjust the light level to their own requirements using the push-button. Automatic management will take over again when the user is absent.

The area on the window side will thus have a lower level of artificial light than that on the opposite side.

## SOLUTIONS

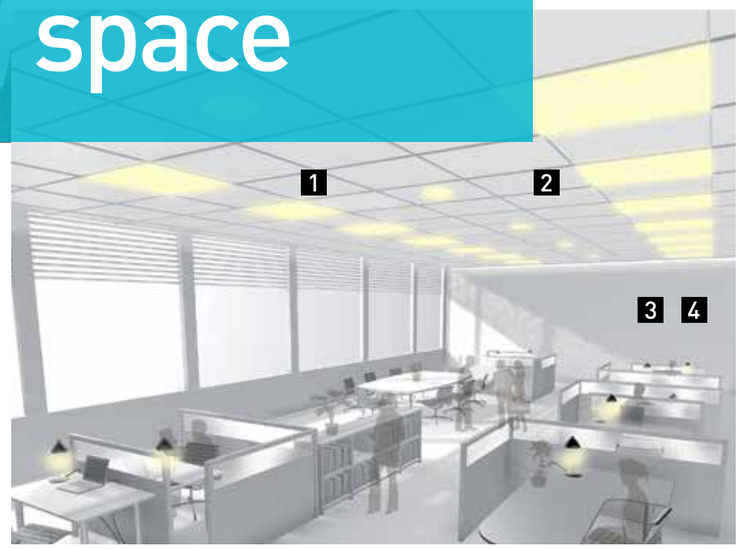


**1**
**Cat.No 488 22**
Dual-tech occupancy sensor
- Range Ø 8 m
- IP 20 Weatherproof rating
- Ceiling mounted

**2**
**Cat.No 488 44**
Room controller for DALI and DSI dimming
- Occupancy mode, vacancy mode.
- The room controller applies a dimming difference of 30, 50 or 80% between the window and the corridor side.
- Fixed directly to the false ceiling via cable ducting.

**3** The push-button **Cat.No 5 720 31** can be used to control lighting circuits manually.

# Open space




The lighting must adapt to whether or not the office areas and aisles are occupied, while taking the natural light level into account.

## CONTROL REQUIREMENTS

Lighting is switched ON manually and switched OFF automatically or manually.

**Switch-on**
Manual via push-button or touch screen.

**Switch-off**
- Gradual, as soon as the natural light level is sufficient.
- Automatic when the area in the open plan office is no longer occupied (after a time delay).
- Manual via push-button or touch screen.

**Lighting regulation**
The amount of artificial lighting is adapted according to the natural light, so that a minimum lighting level is constantly maintained.

Note: users can adjust the light level to their own requirements using the push-button. Automatic management will take over again when the user is absent.

The area on the window side will thus have a lower level of artificial light than that on the opposite side.

## SOLUTIONS

**1**
**Cat.No 488 22**
Dual-tech occupancy sensor
- Range Ø 8 m
- IP 20 Weatherproof rating
- Ceiling mounted

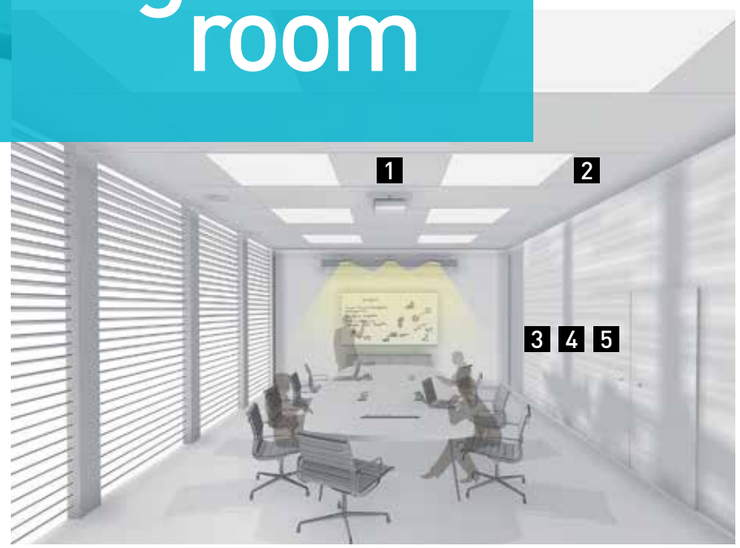
**2**
**Cat.No 488 44**
Dimming room controller for DALI protocol
- Fixed directly to the false ceiling via cable ducting.

**3** The push-button **Cat.No 675 53** can be used to control and dim lighting circuits manually.

**4** The touch screen **Cat.No 5 739 58** can be used to activate scenarios.



# Meeting room




Room occupants must be able to control and dim the light and also the blinds, screen and ventilation according to their requirements.

## CONTROL REQUIREMENTS

Lighting and fan are switched ON manually and switched OFF automatically or manually.

**Switch-on**
Manual via push-button or touch screen.

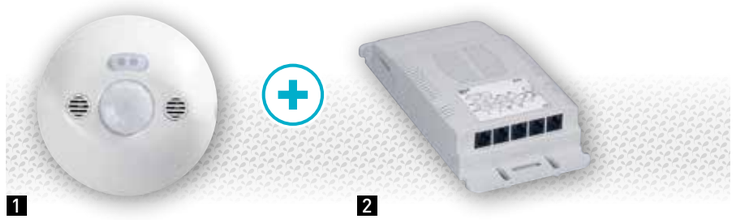
**Switch-off**
- Gradual, as soon as the natural light level is sufficient.
- Automatic by detection that there is no-one present in the meeting room (after time delay).
- Manual via push-button or touch screen.

**Lighting regulation**
The amount of artificial lighting is adapted according to the natural light, so that a minimum lighting level is constantly maintained.

Note: users can adjust the light level to their own requirements using the push-button. The area on the window side will thus have a lower level of artificial light than that on the opposite side.

The scenario push-buttons, remote control or touch screen can be used to activate projection, end projection, full light scenarios. The ventilation will switch from ECO mode to COMFORT mode when a person is detected.

## SOLUTIONS



**1**
**Cat.No 488 22**
Dual-tech occupancy sensor
- Range Ø 8 m
- IP 20 Weatherproof rating
- Ceiling mounted

**2**
**Cat.No 488 44**
Multi-application room controller:
- 2 x 1-10 V dimming output
- 1 blind output
- 1 fan output

Fixed directly to the false ceiling via cable ducting.

**3** The push-button **Cat.No 675 53** can be used to control and dim lighting circuits manually.

**4** The touch screen **Cat.No 5 739 58** can be used to activate scenarios.

**5** An additional remote control **Cat.No 882 32** can provide more flexibility for the occupants.

# Motion and Lighting Management sensors for 1 circuit

**selection chart**

| MOTION SENSORS | | | |
|---|---|---|---|
| AREAS WITHOUT NATURAL LIGHT | INSTALLATION | | |
| | Ceiling | Wall | |
| | | Surface mounting | Flush-mounting |
| **PASSAGEWAY** | | | |
| **Hall/lobby<br>Stairways/hallways<br>Storage areas/technical areas** | 488 03(1) Ø 8 m | 489 11(2) 8 m | - |
| **OUTDOOR AND DAMP AREAS** | | | |
| **Indoor/external car park<br>Indoor entrance areas** | IP 55 489 33 Directional head 270° 20 m | IP 66 488TRI3W 120° 18 m | - |

| LIGHTING MANAGEMENT SENSORS | | | |
|---|---|---|---|
| AREAS WITH NATURAL LIGHT | Automatic On-Off<br>Checking permanently the presence and daylight level | | |
| **WORK AREAS** | | | |
| **Individual office/small room** | 488 04(3) Ø 8 m | 489 14(2) 8 m | 0 784 51 8 m |
| **Open plan office/classroom/ meeting room** | 488 06(1) Ø 8 m | 489 16(2,3) 8 m | 0 784 52 8 m |
| **PASSAGEWAY** | | | |
| **Hall/lobby<br>Stairways/hallways** | 488 07(1) Ø 8 m | - | - |
| **Hallways<br>Very long areas** | 488 17(1) 2 x 12 m | - | - |
| **High ceiling areas (gymnasium, storage areas...)** | IP 66 489 32 (Flush-mounting) Ø 20 m, 10 m fixing height | IP 55 489 33 270° 20 m | - |
| **Restrooms, bathrooms<br>Dressing room** | 488 04(3) Ø 8 m | 489 16(2,3) 8 m | - |
| **OUTDOOR & DAMP AREAS** | | | |
| **Indoor/outdoor car park lot<br>Indoor entrance areas** | IP 66 489 32 Ø 20 m, 10 m fixing height<br>IP 55 489 33 Directional head 270° 20 m | IP 55 489 33 Directional head 270° 20 m | - |

1: Surface mounting box option - 2: corner mounting option - 3: 1 lighting output + 1 fan output





# Lighting Management sensors and room controllers for multiple circuits

**selection chart**

| CHOOSE THE SENSOR | Automatic On-Off<br>Checking permanently the presence and the light level | | |
|---|---|---|---|
| | INSTALLATION | | |
| | Ceiling | Wall | |
| | | Surface mounting | Flush-mounting |
| **WORK AREAS** | | | |
| **Individual office<br>Classroom** | 488 22 Ø 8 m | 488 23 5 m | - |
| **PASSAGEWAY** | | | |
| **Restrooms, changing rooms** | 488 20 Ø 8 m | 488 24 5 m | - |
| **Hallways<br>Very long areas** | 488 20 Ø 8 m | - | - |
| **OUTDOOR & DAMP AREAS** | | | |
| **Car park, cellar, laboratory, test room, changing room** IP 55 | - | 488 30 270° 15 m 15 m 10 m | - |

| AND THE OUTPUTS TO BE MANAGED | ON-OFF | DIMMING | | |
|---|---|---|---|---|
| | | DALI | 1-10 V | Halogen - Incandescent - Dimmable LEDs (1) |
| **1 lighting circuit in the same room** | 488 50 | 488 51* | - | 488 45 |
| **1 lighting circuit + fan output in the same room** | 488 50 | 488 51* | - | - |
| **2 lighting circuits in the same room** | 488 50 | 488 51* | - | 488 45 |
| **2 lighting circuits + 1 fan output in the same room** | - | 488 51* | - | - |
| **2 lighting circuits** (2 inputs, 2 outputs) **in 2 rooms** | 488 41 | - | 488 42 (1000 VA) | 488 45 |
| **4 lighting circuits** (4 inputs, 4 outputs) **in 4 rooms** | 488 43 | 488 44 (max. 32 ballasts) | 488 43 | - |

1: Refer to the load table in the data sheet available online in the e-catalogue (**Note:** some commercially available dimmable LEDs are not compatible)

* Available 2015

# Motion sensors for 1 circuit

## motion sensors for passageway without natural light


489 11


488 03


488TRI3W

Selection chart **p. 22**

Automatic on/off
Manual adjustment of light level threshold and time delay via potentiometer
All load 8.5 A - 240 V

| Pack | Cat.Nos | Ideal for passageways |
|---|---|---|
| 1 | 489 11 | **Surface mounted on wall**<br>PIR wall mounted motion sensor<br>180° infrared detection, range 8 m<br>Recommended fixing height: 2.5 m<br>3-wire with neutral<br>IP 42<br>Light level threshold: 1 to 1000 lux<br>Adjustable time delay: 5 s to 30 min<br>Standby consumption: 0.7 W<br>For direct surface mounting on wall<br>Can be mounted in/on a corner using accessory Cat.No 489 71 (p. 28) |
| 6 | 488 03 | **Ceiling mounted**<br>PIR ceiling motion sensor<br>360° infrared detection, range Ø8 m<br>Recommended fixing height: 2.50 m<br>3-wire with neutral<br>IP 41<br>Light level threshold: 1 to 1000 lux<br>Adjustable time delay: 5 s to 30 min<br>Standby Consumption: 0.4 W on standby<br>Optimum distance between 2 sensors: 6 m<br>Fixes directly to a false ceiling with mounting claws (included) or installed in a Batibox box, depth 50 mm<br>Can be surface mounted on ceiling using accessory Cat.No 488 75 (p. 28) |

| Pack | Cat.Nos | Ideal for outdoor and damp areas |
|---|---|---|
| 1 | 488TRI3W | **Surface mounted on wall**<br>PIR, microwave and photoelectric sensor wall mounted motion sensor<br>120° infrared detection, range 8 m<br>Recommended fixing height: 2.5 m<br>3-wire with neutral<br>IP 66<br>Light level threshold: 10 to full sunlight lux<br>Adjustable time delay: 8 s to 15 min<br>Standby consumption: 0.5 W<br>For direct surface mounting on wall |



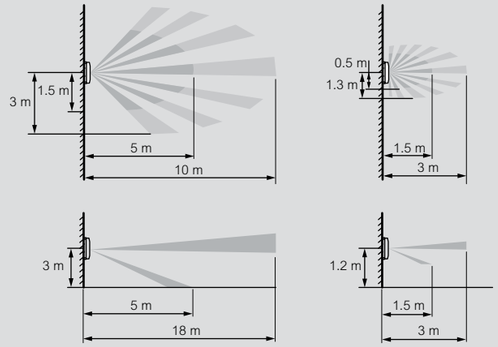


# Motion sensors for 1 circuit

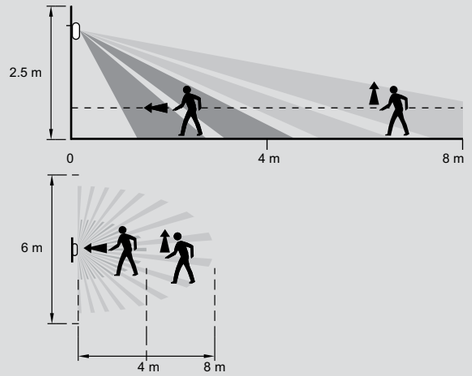
## detection areas and load table

### Detection areas

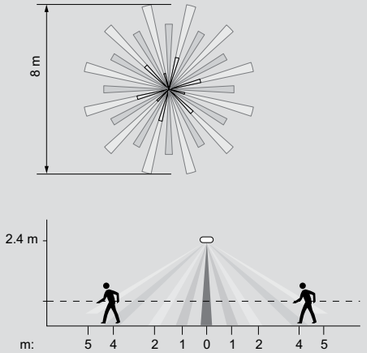
**Cat.Nos 488TRI3W**




**Cat.Nos 489 11**




**Cat.No 488 03**




### Load table

| Cat.No | Halogen bulb | ELV halogen with ferromagnetic transformer | ELV halogen with electronic transformer | Fluorescent tube | Compact fluorescent bulb | LED |
|---|---|---|---|---|---|---|
| **489 11** | 2000 W | 1000 VA | 1000 VA | 10 x (2 x 36 W) | 250 W | 250 W |
| **488 03** | 2000 W | 1000 VA | 1000 VA | 10 x (2 x 36 W) | 250 W | 250 W |
| **488TRI3W** | 2000 W | 2400 VA | 2400 VA | 10 x (2 x 36 W) | 2400 W | 1200 W |

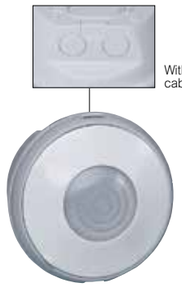
# Lighting Management sensors for 1 circuit

## Lighting Management sensors for passageway with natural light


488 17


488 07


489 33



489 32

Selection chart **p. 22**
Load table **p. 29**

Check presence and natural light level continuously, switch off when there is sufficient natural light
Occupancy mode (automatic switch-on/off factory setting). Can be used with pushbutton Cat.No 572 030 (or illuminated pushbutton Cat.No 572 032) for vacancy mode (manual switch-on and manual or automatic switch-off). Precise on-site adjustment using configuration tool Cat.No 882 30(p. 28)
Adjustable time delay: 5 s to 59 min. Light level threshold adjustable from 5 to 1275 lux

| Pack | Cat.Nos | Ideal for passageways |
|---|---|---|
| 1 | 488 17 | **Ceiling mounted**<br>Fix directly to a false ceiling with mounting claws (included) or installed in a Batibox box, depth 50 mm, Cat.No 800 51<br>3-wire with neutral<br>Standby consumption: 0.4 W<br>Recommended fixing height: 2.5 m<br><br>PIR ceiling mounted Lighting Management sensors<br>360° infrared with detection angle of 2 x 12 m<br>Ideal for hallway<br>IP 20<br>Optimum distance between 2 sensors: 20 m<br>Connection via automatic terminals<br>Surface mounted on ceiling using accessory Cat.No 488 75 (p. 28) |
| 1 | 488 07 | PIR ceiling mounted Lighting Management sensors<br>360° infrared detection, range Ø8 m<br>Optimum distance between 2 sensors: 6 m<br>Connection via automatic terminals<br>Surface mounted on ceiling using accessory Cat.No 488 75 (p. 28) |

| Pack | Cat.Nos | Ideal for outdoor and damp areas |
|---|---|---|
| 1 | 489 33 | **Wall or ceiling mounted**<br>PIR wall and ceiling mounted multi lens Lighting Management sensors<br>270° infrared detection with directional head, range 20 m<br>Recommended fixing height: 2.5 m<br>3-wire with neutral<br>IP 55<br>Standby consumption: 0.7 W<br>Can be mounted in/on a corner using accessory Cat.No 489 72 (p. 28) |

| Pack | Cat.Nos | Ideal for high ceiling areas |
|---|---|---|
| 1 | 489 32 | **Ceiling mounted**<br>PIR ceiling mounted Lighting Management sensors<br>360° infrared detection, Ø20 m at 10 m high, Ø8 m at 2.5 m high<br>3-wire with neutral<br>IP 55, IP 66 with cable gland Cat.No 0 980 03<br>Optimum distance between 2 sensors: 20 m<br>Standby consumption: 0.4 W<br>Compatible with Cablofil cable trays |





# Lighting Management sensors for 1 circuit

## Lighting Management sensors for work areas with natural light


488 06


489 16

Lighting Management sensor: Integrated pushbutton


0 784 52


488 04

Selection chart **p. 22**
Load table **p. 29**

Check presence and light level continuously, switch off when there is sufficient natural light
Manual switch-on and manual or automatic switch-off (factory setting)
Can be used with pushbutton Cat.No 5 720 30 (or illuminated pushbutton Cat.No 5 720 32) for manual switch-on and manual or automatic switch-off
Infrared and ultrasonic motion sensors for workplaces, providing precise presence detection as soon as the wave transmitted by the sensor is modified (for example, by hand movement on a keyboard)
Precise on-site adjustment using configuration tool (p. 28)

| Pack | Cat.Nos | Ideal for work areas |
|---|---|---|
| 1 | 488 06 | Suitable for meeting room, classroom, open plan office, etc.<br>**Ceiling mounted**<br>Dual technology ceiling mounted Lighting Management sensors<br>Connection via automatic terminals<br>Surface mounted on ceiling using accessory Cat.No 488 75 (p. 28)<br>360° infrared and ultrasonic detection, Ø8 m<br>IP 20<br>3-wire with neutral<br>Optimum distance between 2 sensors: 6 m<br>Standby consumption: 0.8 W<br>Fix directly to a false ceiling with mounting claws (included) or installed in a Batibox box, depth 50 mm Cat.No 800 51 |
| 1 | 489 16 | **Surface mounted on wall**<br>Dual technology wall mounted Lighting Management sensors with presence output<br>180° infrared and ultrasonic detection, range (front) 8 m<br>Recommended fixing height: 2.5 m<br>3-wire with neutral<br>IP 42<br>Additional 2 A contact for HVAC control based on presence data<br>Consumption: 0.4 W on standby<br>Optimum distance between 2 sensors: 10 m<br>Surface mounted on ceiling using accessory Cat.No 489 71 (p. 28) |

| Pack | Cat.Nos | Ideal for offices |
|---|---|---|
| 1 | 0 784 52 | **Wall mounted**<br>Dual technology flush mounted Lighting Management sensors with neutral<br>180° infrared and ultrasonic detection, range 8 m<br>Recommended fixing height: 1.20 m<br>Standby consumption: 0.2 W<br>Optimum distance between 2 sensors: 6 m<br>3-wire cable<br>IP 20<br>For installation in box, depth 40 mm min., or in surface mounting box Cat.No 800 51<br>2 modules |

| Pack | Cat.Nos | Ideal for individual office |
|---|---|---|
| 1 | 488 04 | **Ceiling mounted**<br>Additional 2 A contact for HVAC control based on presence data<br>PIR ceiling mounted Lighting Management sensors<br>360° infrared detection, Ø8 m range<br>3-wire with neutral<br>Optimum distance between 2 sensors: 6 m<br>Standby consumption: 0.4 W<br>Fixes directly to a false ceiling with mounting claws (included) or installed in a Batibox box, depth 50 mm<br>Surface mounted on ceiling using accessory Cat.No 488 75 (p. 28)<br>IP 20 |

# Configuration tools and accessories

882 35

882 30

RJ 45 connectors

488 72

488 68

| Pack | Cat.Nos | |
|---|---|---|
| | | **Configuration tools for Lighting Management sensors** |
| 1<br>1 | 882 35<br>882 30 | All sensors are supplied with factory settings:<br>- 500 lux light level threshold for ceiling mounted sensors, 300 lux for surface and flush mounting sensors<br>- 15-minute time delay and walkthrough function activated<br>The configuration tools are used to adjust these presets and the detection sensitivity.<br>Step programming on preset buttons<br>Digital programming to one decimal place on the digital screen<br>Instant programming control<br>Used to display the parameters of each sensor<br>Option to store settings in the memory and to apply them to other sensors<br>Standard preset configurations for each room type (office, hallway, etc.) according to EN 12 464 (European Standard) |
| | | **RJ 45-BUS/SCS connector** |
| 10 | 488 72 | Used to connect controller(s) and sensor(s) to a BUS/SCS cable via tap-off<br>Male connector |
| | | **RJ 45 doubler** |
| 10 | 488 68 | Used to double the number of controller inputs |
| | | **Surface mounting boxes** |
| 5 | 488 75 | Used for surface mounting ceiling mounted sensors<br>For ceiling mounted sensors Cat.Nos 488 04/06/07/17/20/22 |
| | | **Fixing accessories for installation in/on corners** |
| 1 | 489 71 | Used to surface mount sensors in/on corners<br>For surface mounting sensors Cat.Nos 488 11/16 |

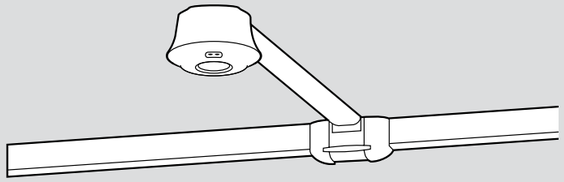
Configuration tools and accessories

## Customising settings on-site

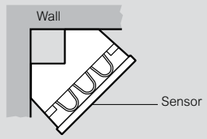
All sensors are preset in the factory
- 500 lux light level threshold for ceiling mounted sensors and 300 lux for surface mounting sensors
- 15-minute time delay and walkthrough function activated

The configuration tools are used to adjust the preset settings and the detection sensitivity

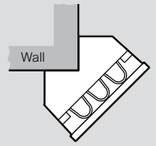
## Installing surface mounting boxes Cat.Nos 488 75



## Installing fixing accessories in/on a corner Cat.Nos 489 71 (view from above)




Mounting in internal corner




Mounting on external corner



legrand

# Motion sensors and Lighting Management sensors for controllers

## Example of how Lighting Management sensors function in an office

Deliberate switch-on action
Lighting switches off automatically when there is sufficient natural light, in accordance with European standard EN 15 193

**Arrival: low light level**

▶ On entering the room the light is switched on using the push button by the door

**Strong light level**

▶ When someone is in the room, the sensor will automatically turn the light off if the light level threshold is reached(1)

**Fading light level**

▶ When someone is in the room, the sensor automatically turns the light back on.

**Departure: end of day**

▶ On leaving the room, the light is switched off by pressing the push button. If the light is not switched off, the sensor will automatically operate.

1: Press the pushbutton to keep the light on

## Load table

| Cat.No | Halogen bulb | ELV halogen with ferromagnetic transformer | ELV halogen with electronic transformer | Fluorescent tube | Compact fluorescent bulb | LED | Fluorescent bulb with 1-10 V ballast | DALI | Volt-free motor contact |
|---|---|---|---|---|---|---|---|---|---|
| **488 20/22<br>488 24/30/23<br>+ 488 50** | 3600 W | 1800 VA | 1800 VA | 10 x (2 x 36 W) | 250 W | 250 W | - | - | 2 A |
| **488 20/22<br>488 24/30/23<br>+ 488 51** | - | - | - | - | - | - | - | 32 ballasts | 2 A |
| **488 04** | 2000 W | 1000 VA | 1000 VA | 10 x (2 x 36 W) | 250 W | 250 W | - | - | 2 A |
| **488 07** | 2000 W | 1000 VA | 1000 VA | 10 x (2 x 36 W) | 250 W | 250 W | - | - | - |
| **488 06** | 2000 W | 1000 VA | 1000 VA | 10 x (2 x 36 W) | 250 W | 250 W | - | - | - |
| **488 17** | 2000 W | 1000 VA | 1000 VA | 10 x (2 x 36 W) | 250 W | 250 W | - | - | - |
| **0 784 52** | 2000 W | 1000 VA | 1000 VA | 10 x (2 x 36 W) | 250 W | 250 VA | - | - | - |
| **489 16** | 2000 W | 1000 VA | 1000 VA | 10 x (2 x 36 W) | 250 W | 250 VA | - | - | 2 A |
| **489 32** | 2000 W | 1000 VA | 1000 VA | 10 x (2 x 36 W) | 250 W | 250 VA | - | - | - |
| **489 33** | 2000 W | 1000 VA | 1000 VA | 10 x (2 x 36 W) | 250 W | 250 VA | - | - | - |

1: Operates with dimmable LEDs

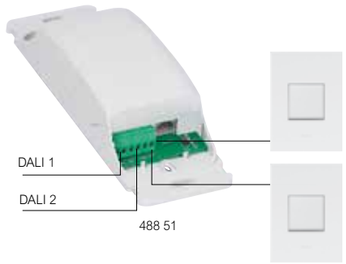
Best practice guide for office buildings available at **www.legrand.com**

# Lighting Management sensor for managing several circuits

**multi-circuit ceiling mounted controllers for areas with natural light**

Local control solutions

Rear view
Connection via screw terminals




488 51

Rear view
Connection via screw terminals

488 41

Sensor and controller selection chart **p. 23**

Ceiling mounted or installed in Cablofil cable trays (see Legrand Cable Management catalogue)
Connection to sensors (Cat.Nos 488 20/22/30/24/23) by cord or RJ 45 cable or BUS/SCS cable to be fitted with RJ 45 connector Cat.No 488 72 (p. 31)

| Pack | Cat.Nos | For controlling 1 or 2 circuits in one room |
|---|---|---|
| | | 1 sensor input, 2 inputs for auxiliaries<br>2 outputs<br>Can be used with a pushbutton, including a pushbutton with LED indicator, Cat.Nos 5720 30/32 for manual switch-on and manual or automatic switch-off |
| | | **ON/OFF** |
| 1 | 488 50 | 2 x 16 A outputs<br>Used to control 2 ON/OFF lighting circuits or 1 lighting circuit + 1 ventilation circuit<br>Connection via screw terminals |
| | | **Dimming - DALI ballast** 2015 |
| 1 | 488 51 | 2 DALI outputs (32 ballasts max.) and 1 ventilation output (volt-free contact)<br>Used to dim the light level on the window side of a room (where there is more natural light) separately from the corridor side<br>Used to control a maximum of 32 DALI ballasts<br>Connection via screw terminals |
| | | **For controlling 2 lighting circuits** |
| | | Can be controlled for each output by a sensor and/or an individual BUS control unit<br>Addressing methods using sensors and control units:<br>- automatic configuration<br>- custom configuration by pressing the "Learn" button on the product |
| | | **ON/OFF** |
| 1 | 488 41 | 2 x 16 A outputs |
| | | **Dimming - 1-10 V ballast** |
| 1 | 488 42 | 2 outputs<br>1000 VA maximum per output |
| | | **Dimming - LV and ELV halogen** |
| 1 | 488 45 | 2 outputs<br>1000 W maximum per output |

| Pack | Cat.Nos | For controlling 4 lighting circuits |
|---|---|---|
| | | Can be controlled for each output by a sensor and/or an individual BUS control unit<br>Addressing methods using sensors and control units:<br>- automatic configuration<br>- custom configuration by pressing the "Learn" button on the product |
| | | **Dimming - ballast 1-10 V or ON/OFF** |
| 1 | 488 43 | 4 outputs<br>1000 VA maximum per output |
| | | **Dimming - DALI ballast** |
| 1 | 488 44 | 4 outputs<br>32 ballasts maximum per output |



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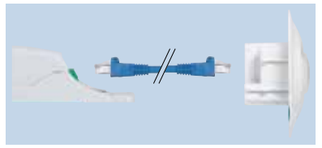
# Lighting Management sensors for managing several circuits

**Lighting Management sensors for controllers for passageway and work areas with natural light**

Local control solutions



Connection to controller via cord or RJ 45 cable

488 20

488 22

488 23

Sensor and controller selection chart **p. 23**

Check presence and light level continuously, switch off when there is sufficient natural light
Automatic switch-on/off (factory setting)
Precise on-site adjustment using configuration tool (p. 28)
Connect to controllers by cord or RJ 45 cable or BUS/SCS cable to be fitted with RJ 45 connector Cat.No 488 72 (p. 28)

| Pack | Cat.Nos | Ideal for large areas |
|---|---|---|
| | | **PIR ceiling mounted sensor** |
| 1 | 488 20 | 360° infrared detection, range Ø8 m<br>Optimum distance between 2 sensors: 6 m<br>Consumption: 0.2 W on standby<br>Fixes directly to a false ceiling with mounting claws (included) or installed in a Batibox box, depth 50 mm Cat.No 800 51<br>Surface mounted on ceiling using accessory Cat.No 488 75<br>IP 20 |
| | | **PIR wall mounted sensor** |
| 1 | 488 24 | 180° infrared detection with directional head, range (front) 5 m<br>IP 42<br>Consumption: 0.2 W on standby<br>Supplied with fixing plate |
| | | **Ideal for outdoor and damp areas** |
| | | **Surface mounted** |
| 1 | 488 30 | 270° dual infrared detection, side range 2 x 15 m and front range 10 m<br>IP 55<br>Consumption: 0.5 W on standby<br>Supplied with fixing plate |

| Pack | Cat.Nos | Ideal for work areas |
|---|---|---|
| | | **DT ceiling mounted sensor** |
| 1 | 488 22 | 360° infrared and ultrasonic detection, range Ø8 m<br>Recommended fixing height: 2.50 m<br>Optimum distance between 2 sensors: 6 m<br>Consumption: 0.5 W on standby<br>Fixes directly to a false ceiling with mounting claws (included) or installed in a Batibox box, depth 50 mm Cat.No 800 51<br>Surface mounted on ceiling using accessory Cat.No 488 75 (p. 28)<br>IP 20 |
| | | **DT wall mounted sensor** |
| 1 | 488 23 | 180° infrared and ultrasonic detection with directional head, range (front) 7 m<br>IP 42<br>Consumption: 0.5 W on standby<br>Supplied with fixing plate |
| | | **Light level measurement cell** |
| 1 | 488 28 | For synchronising the light level measurement when used with sensors<br>Use the configuration tool Cat.No 882 30 (p. 28) to configure the light level cell<br>Connects to the BUS/SCS cable with connector Cat.No 488 72 (p. 28)<br>IP 20 |
| | | **RJ 45-BUS/SCS connectors** |
| | | Used to connect controller(s) and sensor(s) to a BUS/SCS cable via tap-off |
| 10 | 488 72 | Male connector |
| 10 | 488 73 | Female connector |

# Local or global control,

## the choice is yours!

LOCAL CONTROL
BUS/SCS wiring enables local and remote presence and light level detection management, shutter control, time management and scenario management functions.
Ideal for meeting rooms, small businesses or office spaces.


## RADIO/ZIGBEE®: THE PERFECT COMPLEMENT TO BUS/SCS

As an addition to BUS/SCS wiring, the Radio/ZigBee® offer can be used to install new radio control points without damaging walls.
Ideal for refurbishment installations or glazed surfaces.






67553


5 745 03

Sensor and controller selection chart
Technical characteristics **e-catalogue**

Connection:
- to the BUS/SCS controller via cord or RJ 45 cable or BUS/SCS cable to be fitted with RJ 45-BUS/SCS connector Cat. No 488 72 (p. 28)
- directly to the BUS/SCS cable (supplied with BUS/SCS connector Cat. No 3515 for connection to the BUS/SCS cable via tap-off)
To be fitted with Mosaic cover plates and Batibox support frames

| Pack | Cat.Nos | |
|---|---|---|
| | | **ON/OFF lighting controls** |
| 1 | Arteor 675 53 | Push-button control used to control 1 controller<br>**1-way**<br>Used to control 1 lighting circuit (1 output)<br>**2-way**<br>Used to control 2 lighting circuits (2 outputs)<br>ON/OFF control unit<br>To be equipped with cover plates, support frames and plates. (Refer to Arteor Catalogue) |
| | | **Switch multifunction controls** |
| 1 | Arteor 675 52 | Used to control several controllers (or several outputs on one or more controllers): ON/OFF, dimming, ventilation, roller shutters<br>"Switch type" multifunctional control unit<br>To be equipped with cover plates, support frames and plates. (Refer to Arteor Catalogue) |
| | | **Scenario controls** |
| | | Used to control several controllers<br>**2 scenarios**<br>4 buttons used to manage the start and end of each scenario<br>Example: adjusting lighting levels, controlling lighting with shutters, etc. |
| 1 | Arteor 5 739 02 | ○ White |
| 1 | 5 739 03 | ● Magnesium |
| 1 | 5 745 03 | ○ White |
| 1 | 5 745 04 | ● Magnesium |
| | | **MyHome screen 3.5”** |
| 1 | 5 739 58 | 3.5» colour touch screen for the management of light functions, automation, burglar alarm, temperature control, sound system, scenarios and energy management<br>Equipped with front panel USB connector for setup and ready for Open Webnet programming language |

## Notes

HPM Legrand - AUS
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EXB13016 - February 2014