TECHNICAL GUIDE

LIGHTING
MANAGEMENT SENSORS



INSTALLATION AND USER GUIDE

THE GLOBAL SPECIALIST IN ELECTRICAL
AND DIGITAL BUILDING INFRASTRUCTURES

legrand®

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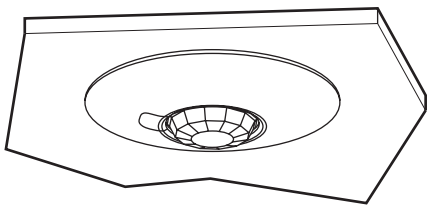
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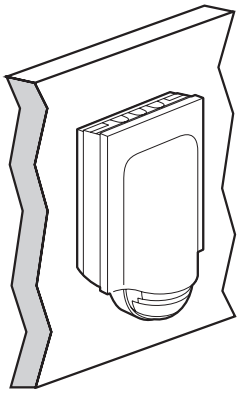
INTRODUCTION

INTRODUCTION

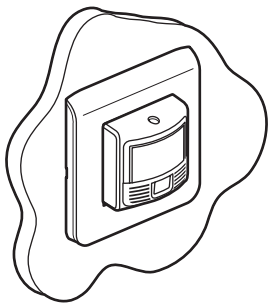
Legrand lighting management sensors are suitable for a wide range of applications. They can be used to control all loads available on the market (ON/OFF load, dimmable load, motors for ventilation or blinds, etc.) and comply with the standards required by law (public buildings, etc.). The range offers choices for installation in all types of location (IP index ranging from IP20 to IP66 depending on the catalogue numbers) and for all types of fitting (false ceiling/ceiling/surface mounting on wall/flush-mounting on wall/replacing an existing switch).



False ceiling



Surface mounted on wall



Flush-mounted on wall

It is easy to set their parameters using an IR configuration tool which does not require any work to be carried out on the ceiling.

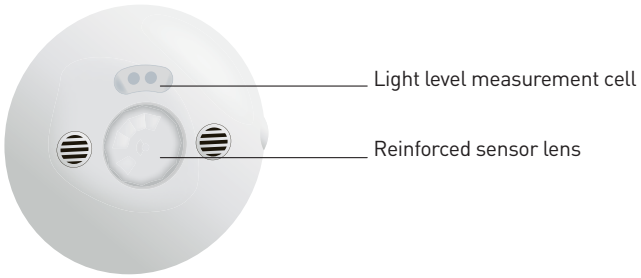
The lighting management range consists of:

- Lighting management sensors
  These control the switching ON/OFF of loads, and can be overridden by pushbuttons or remote controls.
  Some sensors have a "presence" output to control ventilation.
- Stand-alone controllers used together with one (or more) BUS/SCS sensors
  These control dimmable loads (DALI/DSI, 1-10 V, LV/ELV halogen, LED, etc.). They can also be overridden by pushbuttons and remote controls. Some controllers have a "presence" output to control ventilation.

SENSORS

OPERATING MODES

All Legrand sensors have a motion sensor and a light level cell.



There are several switch-on modes.

Automatic mode

The sensor switches on the group of lights automatically when it detects that a person is present and there is an inadequate light level, and switches them off automatically after a determined time when no-one is present.
(This operating mode does not preclude the use of manual controls to override automatic operation).

Walk-through mode

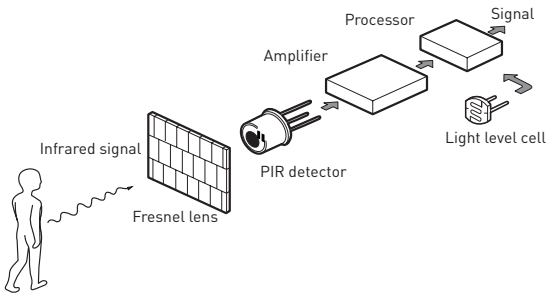
The sensor switches on the group of lights automatically when it detects that a person is present and there is an inadequate light level, and switches them off automatically after a determined time when no-one is present.
If the occupant is no longer detected after 20 s, the non-presence time will be reduced to 3 min (if the preset non-presence time is longer than 3 min).
This mode is most useful for areas where people move around that are used very little, as it saves an average of 5 times more energy than automatic mode.
This operating mode does not preclude the use of manual controls to override automatic operation.

Manual ON/auto OFF MODE

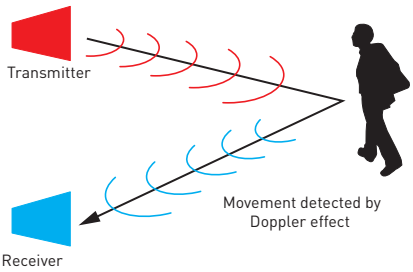
The user must switch on the lights manually, and the sensor switches them off automatically if the user has forgotten to do so when leaving. In this mode the light level cell has no effect on the switching on of the lights, but regulation is nevertheless activated.
This mode saves more energy than automatic mode (15%) but it does not take account of the person's visual comfort.
This mode is recommended for work areas in which there is daylight.

Partial ON/group OFF MODE

In this mode a lighting circuit is switched on when presence is detected and there is an inadequate light level (or the circuit can be switched on manually), and several circuits are switched off.
In a meeting room for example, the main lighting circuit will be controlled and regulated by the presence sensor. Other, secondary, lighting circuits will be switched on manually. When occupants are no longer detected, the sensor will control the switching off of all the circuits in the room.
This mode is only available in the system offer.



Infrared detection



Ultrasound detection

DEFINITIONS OF DETECTION TECHNOLOGIES

PIR: Infrared

PIR (Passive InfraRed) is a detection technology based on pyroelectric sensors, which measure variations in temperature.
The sensors react to sudden changes in thermal energy by detecting the appearance of this energy at the wavelength emitted by humans.
They must be located in direct line of sight of an occupant to detect his/her presence. A curved faceted lens defines the field of vision as a multitude of vertical and horizontal detection cones projected by the sensor.

The further away a person is from the sensor, the wider the space between the cones.
The sensitivity of the motion sensor therefore decreases as the distance increases.

The parameters read by the sensor are temperature and area. When the temperature approaches that of the human body, the sensor has difficulty carrying out detection.

The best position for the sensor is perpendicular to the trajectory of people's movements.

US: Ultrasound

These sensors emit sound waves that are undetectable to the human ear and use a quartz crystal oscillating at a frequency of 40 kHz with a power of < 110 dB at a distance of 1.5 m.
These waves are emitted within the sensor's coverage radius and bounce off objects, surfaces and people. When the waves return to the sensor, their frequency is measured. Movement is detected by a slight change in frequency (Doppler effect), triggering a presence signal.
The US sensor can "see" around objects and surfaces as long as the surfaces in an enclosed area are hard enough to enable the sound waves to bounce off them.
No emission of radio waves. Ultrasound = mechanical vibration.

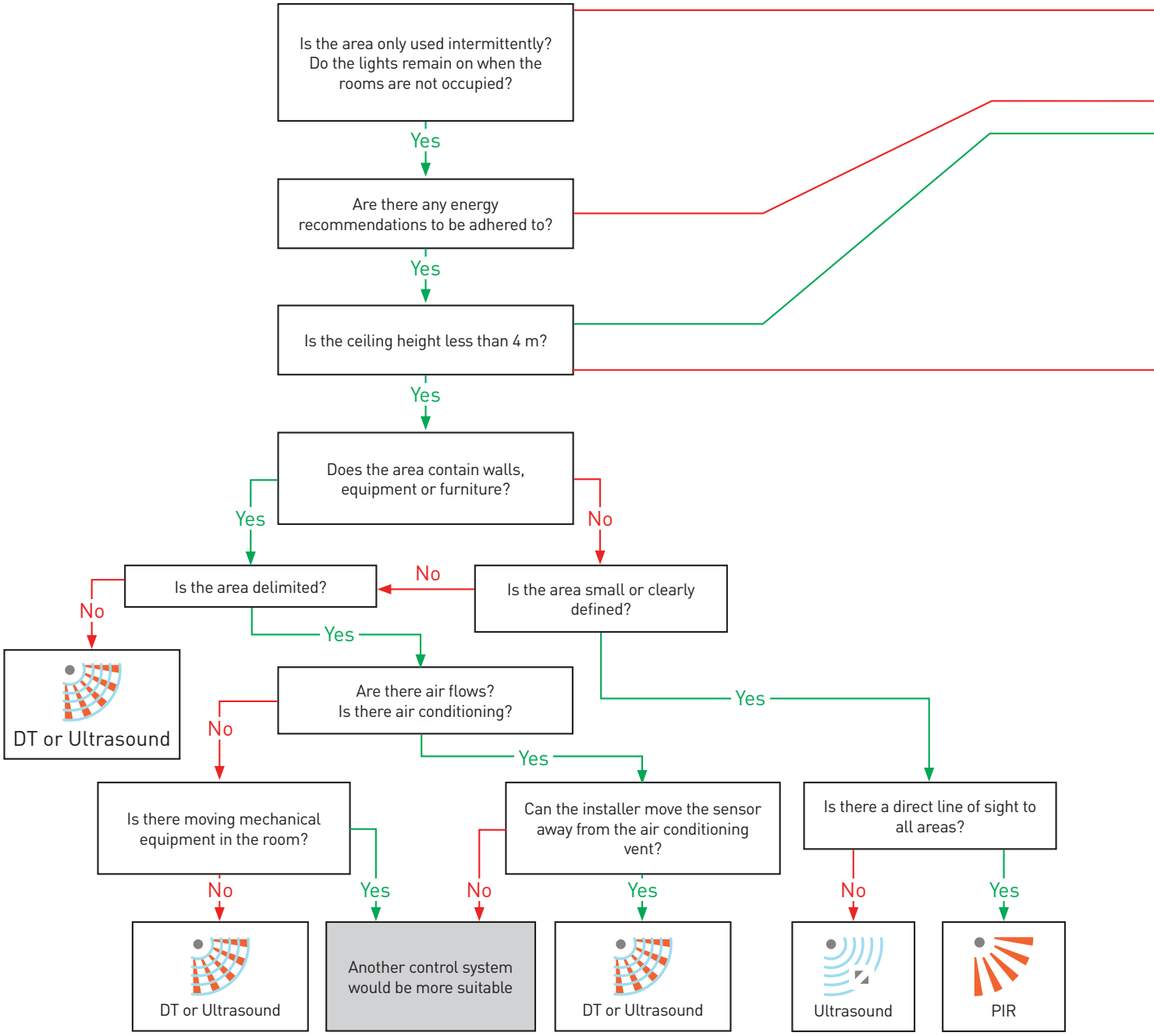
The best position for the sensor is facing the trajectory of people's movements.

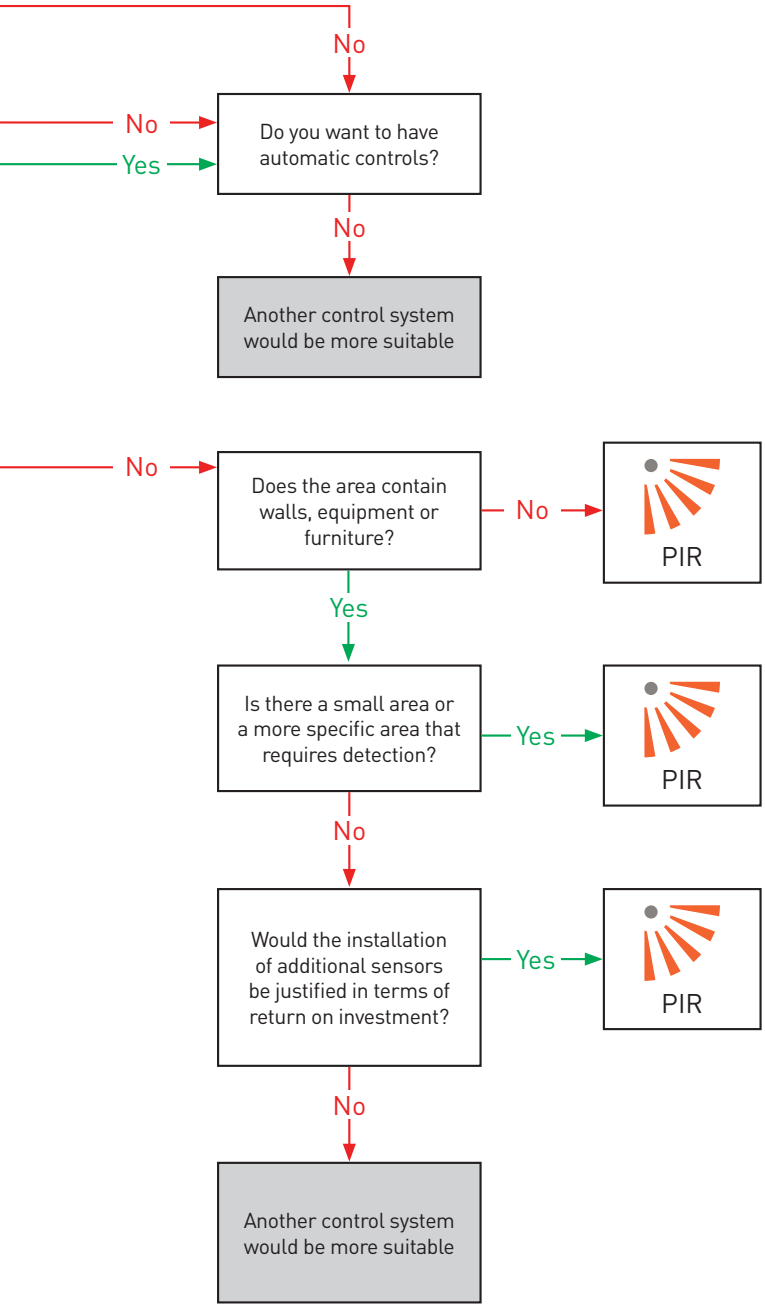
Man can hear up to 20 kHz, cats up to 25 kHz and dogs up to 35 kHz. Ultrasound has no effect on humans and animals.

DUAL: Dual technology (PIR + US)

Dual technology sensors use PIR and US technologies to provide maximum reliability and coverage with minimum false detection.

SELECTING THE RIGHT DETECTION TECHNOLOGY





SUMMARY OF GOOD PRACTICE

Which sensor in which area?

- Enclosed areas that are obstructed by obstacles: **US sensors**
- Obstacle-free open areas: **IR sensors**
- Areas where there is little movement: **dual technology sensors**

Do

- Position the sensors above or close to the main zones of activity in an area
- Inform occupants about the new devices and how to use them
- Cross detection zones for improved detection and reduced sensitivity without decreasing detection capability
- Maintain a minimum distance of 3 m between two sensors

Don't

Incorrect choice of sensor for these areas:

- **US sensors:**

- In areas where the ceiling is more than 4 m high
- US sensors in places subject to interference from vibration
- In areas in which objects, furniture or walls break the signal
- In areas where the occupants move around very little

Incorrect choice of sensor for these areas:

- Install US sensors facing one another
- Install IR sensors in places where the temperature of the ambient air is similar to that of the human body
- Install sensors less than 2 metres from an air conditioning outlet or a pulsed heating outlet

Incorrect use:

- Control safety lighting and emergency exits with sensors

LIGHTING REGULATION

OPERATING PRINCIPLE

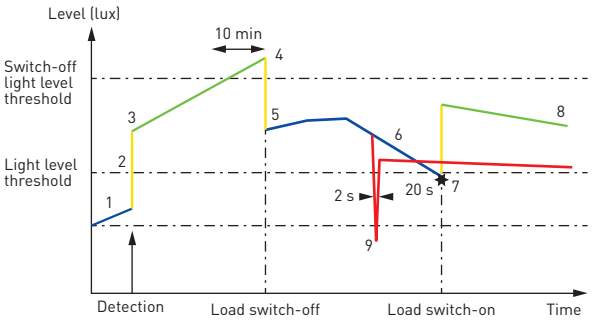
Lighting regulation is only possible in areas that have natural light (window).
The sensors (lighting management, BUS/SCS and ZigBee) measure the light level continuously. It is carried out by means of a light level cell integrated in the sensor.
The lighting will be switched on/off or dimmed continuously according to the light level and whether or not people are present. This function is called lighting regulation.

There are 2 types of lighting regulation:
- **Closed loop** regulation (the sensor uses its own light level cell)
- **Open loop** regulation (the sensor uses a remote light level cell)

The regulation algorithms, executed by the sensors, inform the sensors of the artificial and natural light levels, so that the artificial light level can be adjusted to exactly what is required.

There are 2 types of lighting regulation:
- **Closed loop** regulation (the sensor uses its own light level cell)
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The regulation algorithms, executed by the sensors, enable the sensors to ascertain the artificial and natural light levels, so that the artificial light level can be adjusted to exactly what is required.



REGULATION BY SWITCHING ON/OFF

Key:

- Natural light
- Artificial light
- Sudden drop in light level (for example: a blind is closed)
- Natural + artificial light
- No light

CLOSED LOOP REGULATION

The light level cell in the sensor constantly measures an area's light level (made up of natural and artificial light). The cell in the sensor will switch on/off or dim its associated loads according to variations in the natural light.

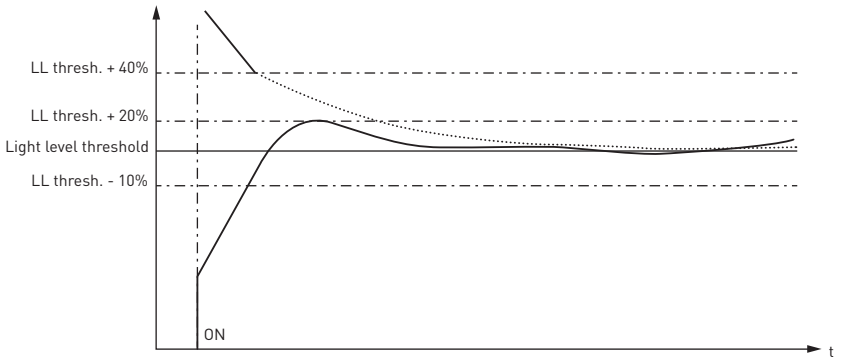
1. Regulation by switching on/off:

To give the switch-off command, the cell must measure a natural light level (and distinguish it from the artificial light provided). If natural light is above the set light level threshold, the loads will be switched off. The switch-off light level threshold must be exceeded for 10 minutes for the cell to give the switch-off command. This avoids unwanted switching off which could cause inconvenience for occupants.

If there is a sudden or gradual change in the natural light level, the cell will immediately reactivate the switch-on command.

Explanation of the above diagram:

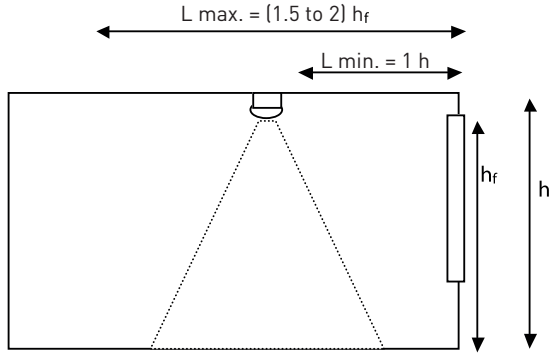
- 1: The light is off.
- 2: A person enters the room and is detected. If the available natural light is below the threshold, the sensor switches on the load.
- 3: The load is on.
- 4: After comparison between the natural and artificial lighting by the light level cell and a period of 10 minutes during which the light intensity of the load is above the switch-off light level threshold, the system switches off the load.
- 5: The load is off.
- 6: The light intensity decreases to the minimum programmed light level threshold.
- 7: If the light intensity falls below the programmed light level threshold for 20 seconds, the sensor switches on the load.
- 8: Regulation is in progress. This ensures that the user has an adequate lighting level in his/her office, as the system adapts the artificial light intensity according to the natural light by switching it ON/OFF.
- 9: If there is a sudden drop in light level (for example: following closing of blinds), the light switches on immediately.



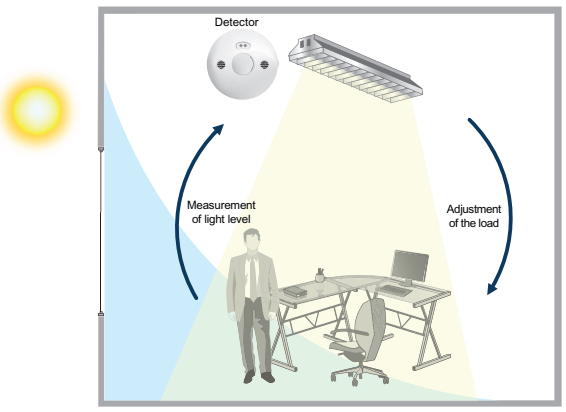
REGULATION BY DIMMING

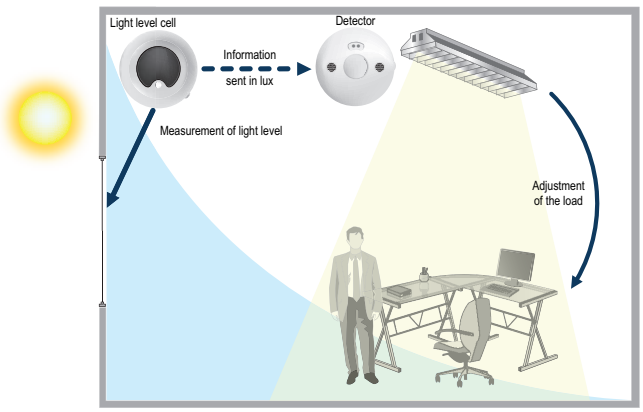
2. Regulation by dimming:
This type of regulation enables the light level of the room to be constantly varied and adjusted. We have chosen an algorithm for a rapid increase in the light level, so that the occupant always has an adequate level, and a slow decrease in the light level.
The time taken to decrease from 100% to 1% can vary between 30 minutes and 90 minutes.

Positioning the sensor for correct closed loop measurement of the light level



To obtain a satisfactory result with the regulation function, it is advisable to have at least one opening (window) to the outside.
It is recommended that the light level cell is placed on the ceiling at a distance of between 1 times the height of the room and a maximum of 1.5 to 2 times the height at the top of the window.
For a ceiling height of 2.8 m and a maximum window height of 2.5 m, the sensor can be placed 2.8 m to 5 m from the window.
Above this limit, regulation of the light according to the natural light entering the room will be less effective as there will be less natural light.





CLOSED LOOP REGULATION

For regulation to be effective, it is important to have a lighting power level close to the light level threshold value.

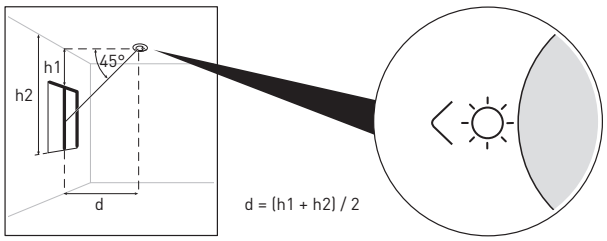
Calculation of the switch-off light level threshold = Light level threshold value x 1.5 + Artificial light provided.
Result to be compared to the value given by the luxmeter to check that the loads switch off.

■ The daylight must be distributed as evenly as possible, and it is preferable not to use partitions that are perpendicular to the window.
■ The light level measurement area should be approximately 12 to 20 m² and 2.5 m high. This does not preclude regulation being carried out in an area smaller than 12 m² if it is enclosed.
■ The distance between 2 sensors must be at least 3 m to prevent "hunting" problems and avoid being influenced by neighbouring luminaires. If they are less than 3 m apart, change to open loop regulation.
■ For optimum operation of the regulation function and maximum energy efficiency, the luminaires must provide sufficient power. The recommended light level is defined by standard EN12464-1 (lighting of workplaces).

OPEN LOOP REGULATION

A dedicated light level cell must be used for this type of regulation.
In this mode, the natural light level is measured by this dedicated cell, which is positioned near a window, facing outwards (not affected by the artificial light).
The measurement taken is sent, via the BUS, to the sensors which will adjust their loads according to the measurement received.
This type of regulation is recommended in open areas, or in areas which receive natural light from a dome.
This type of regulation ensures there is a consistent dimming level and avoids illuminated "halo" effects.
Regulation can be carried out by switching on/off or by dimming.
(See programming on p. 39)

Positioning the cell



SPECIAL FUNCTIONS

These functions are not available on all sensors: please refer to the technical data sheets.

SENSOR IN DETECTION ONLY MODE

Setting the sensor to detection only mode means that the sensor does not take the natural light level into account, even when the first detection occurs.
The sensor will operate by detecting presence.

- **Setting a BUS sensor:**
  The parameter must be set via Virtual Configurator (for more information, see the SCS system guide).
- **Setting a stand-alone sensor:**
  Set the light level threshold to its maximum value (1275 lux).

AUXILIARY OUTPUT

This function is available on certain sensors and controllers. This output controls a volt-free contact, which is closed when presence is detected (natural light level not taken into account). This function is particularly suitable for ventilation (switch from ECO mode to COMFORT mode).

These functions are not available on all sensors. Please refer to the technical data sheets.

EYE

The EYE function enables the installer to set the light level threshold to the ambient light level.

To activate the EYE function:

Go to **Sensor parameters\Light level threshold**, send the EYE value (when the value of the light level threshold is 0, an icon appears on the screen).

The load must be off



The threshold will take the value read by the sensor's light level cell at the moment the command is sent.

Switch off the artificial lighting to ensure that the ambient light level is perceived correctly.

PULSE FUNCTION

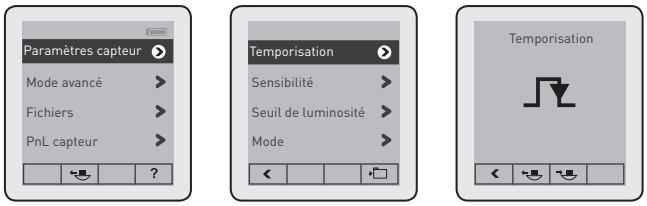
This function enables a pushbutton in an installation with a timer (staircase, corridor type) to be replaced by a sensor.

- In refurbishment projects, use a 2-wire sensor 0 784 57; the time delay of the sensor must be at least the same as that of the timer
- In new projects, use a 3-wire sensor

To activate the PULSE function:

Go to **Sensor parameters\Time delay**, send the PULSE value (when the value of the time delay is 0, an icon appears on the screen), then set the time delay on the timer.

The maximum time delay for the timer is 10'



CONTROLLERS

INTRODUCTION

In the stand-alone range, a BUS/SCS sensor will be used with a controller to control several circuits with ON/OFF operation or to carry out dimming (1-10 V, DALI/DSI). Legrand stand-alone controllers are Plug&Go (configured automatically).

Positive safety

BUS and analogue controllers have a positive safety feature: if there is a communication fault between the sensors and the controllers (sensors not operational or missing) the controller switches on all these loads automatically after a maximum of 10 minutes.

There are two types of controller:

- **BUS/SCS CONTROLLERS**

  In the 2 or 4 I/O and multi-application versions, they provide ON-OFF and dimming (DALI/DSI, 1-10 V, LV/ELV halogen) control of circuits, as well as controlling roller blinds or ventilation, etc. BUS/SCS controllers have an automatic programming mode called Plug&Go. In a room with a number of lighting circuits, it is advisable to have one sensor per lighting line to optimise lighting regulation. If the regulation areas overlap, a light level cell must be added. A local control can be added (BUS/SCS control or remote control) and scenes created: general switch-on/switch-off or projection scene, by programming using Push&Learn.

Plug&Go and Push&Learn programming modes are explained in the SCS system guide

For more information on controllers, please refer to the technical data sheets on legrandoc.com



- **Analogue controllers**

  These are available in ON/OFF and DALI/DSI or 1-10 V dimming versions. Controlled by a sensor, they manage 2 outputs and comply with the standard for public buildings.
  They can therefore manage 2 different circuits (corridor side/window side) in one room. A local control (pushbutton or remote control) can be added to them.

Analogue controllers enable compliance with the standard for public buildings.

0 488 50 – CONTROLLER WITH 2 ON/OFF OUTPUTS

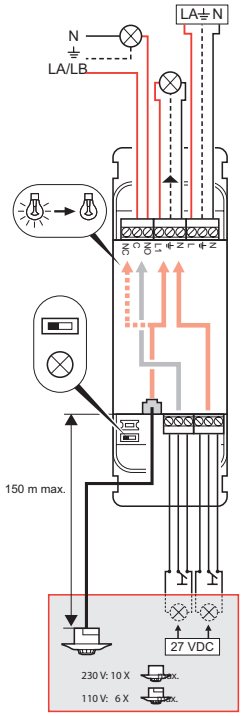
0 488 50 is a controller which, depending on the mode, will control 2 lines of ON/OFF luminaires or 1 line of ON/OFF luminaires + 1 ventilation output.

It has 3 operating modes:

- Mode 1: 1 main line of ON/OFF luminaires + 1 secondary line of ON/OFF luminaires
- Mode 2: 2 synchronised lines of ON/OFF luminaires (special mode for public buildings)
- Mode 3: 1 line of ON/OFF luminaires + 1 ventilation output

The distance between the controller and the furthest sensor is limited to 150 m.

Mode 1 operation



In mode 1, the left-hand pushbutton controls the left-hand lighting circuit (main output) and the right-hand pushbutton controls the right-hand lighting circuit (secondary output).

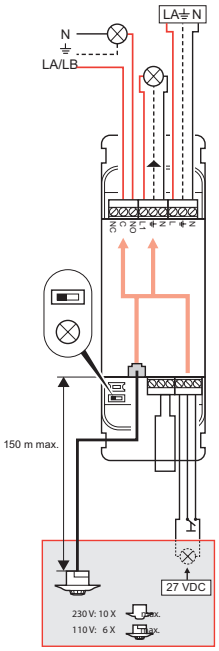
The sensor controls switching on of the main lighting circuit and switching off of both channels at the end of the time delay.

The lighting is regulated automatically if there is a large amount of additional external light, and the main lighting circuit will be switched off if the amount of additional light is very large. If the additional external light falls below the set light level threshold, the main lighting will be switched back on.

The secondary lighting circuit will remain on while the occupant is present.

The selector switch must be in “light” position.

Mode 2 operation



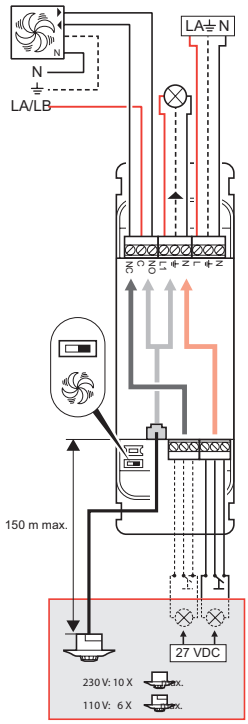
In mode 2, the pushbutton controls both lighting circuits, due to the shunt installed on the control terminals, as shown in the diagram above.

The sensor controls switching on of both lighting circuits and their switching off at the end of the time delay.

The lighting is regulated automatically if there is a large amount of additional external light, and both lighting circuits will be switched off if the amount of additional light is very large. If the additional external light falls below the set light level threshold, both lighting circuits will be switched back on.

The selector switch must be in "light" position.

Mode 3 operation



In mode 3, the left-hand pushbutton (option) controls the ventilation and the right-hand pushbutton controls the lighting circuit.

The sensor controls switching on of the lighting circuit and switches the ventilation to comfort mode. It can also be used to switch off the lighting circuit and to switch the ventilation to eco mode at the end of the time delay.

The lighting is regulated automatically if there is a large amount of additional external light, and the lighting circuit will be switched off if the amount of additional light is very large. If the additional external light falls below the set light level threshold, the lighting will be switched back on.

The regulation has no impact on the operation of the ventilation.

The selector switch must be in "Ventilation" position.

The controller is used to control the state of the ventilation (switch from eco mode to comfort mode)

Several sensors can be installed (up to 10 sensors). The RJ45-BUS/SCS connector 0 488 72 or the RJ45 double connector 0 488 68 can be used to connect all the sensors.

0 488 51 – CONTROLLER WITH 2 DALI OUTPUTS + 1 VENTILATION OUTPUT

Controller 0 488 51 is used to control one or more DALI/DSI ballasts on two separate channels. It has one relay output for controlling the power of the DALI/DSI ballasts, and a second relay output is used to connect a ventilation system activated by presence information from sensors.

As soon as a channel is switched on the relay is closed. Both channels must have been switched off for 5 minutes for the relay to open. This system provides greater energy savings than on the other systems, as the power supply of each ballast is switched off during standby. Bistable relays are used, thus providing additional savings. To protect the relays and optimise their service life, the controller has a system for closing the relay contacts that is synchronised with the switch to zero current.

The controller can control both DALI and DSI ballasts, however the two types cannot be mixed. It automatically detects the type of ballast to be controlled each time it is switched on.

The controller's ventilation output is always associated with the presence data from the sensors. On detection of presence, the ventilation switches to comfort mode, and at the end of the time delay the ventilation switches to eco mode. The ventilation output can be used to activate a socket unit or any other system via a contactor, or for emergency lighting which will switch on when presence is detected.

The controller has a status memory, so that when the mains power returns, it will return to the state it was in before the break for both DALI channels. The state of the ventilation relay is not memorised as all that is needed to trigger it is detection. If the controller has a sensor and there is no-one present after the mains power returns, the system will switch off at the end of the time delay.

Two mechanical pushbuttons can be connected for separate manual control of the two DALI/DSI channels.

If there is only one pushbutton, it must be connected to channel 1 only. This pushbutton will provide ON/OFF control of both channels but will only dim channel 1 (stopping synchronisation between the two outputs).

A short press on the channel 1 pushbutton will restart automatic mode and synchronisation of the two channels.

The two outputs, BP1 and BP2, must not be wired on a single pushbutton

Controller 0 488 51 has 5 operating modes and 1 optional ventilation output

- Mode 1: 2 DALI/DSI outputs with a 30% offset + 1 ventilation output
- Mode 2: 2 DALI/DSI outputs with a 50% offset + 1 ventilation output
- Mode 3: 2 DALI/DSI outputs with an 80% offset + 1 ventilation output
- Mode 4: 2 DALI/DSI outputs with no offset (special mode for public buildings) + 1 ventilation output
- Mode 5: 2 DALI/DSI outputs with a 2/3 offset + 1 ventilation output

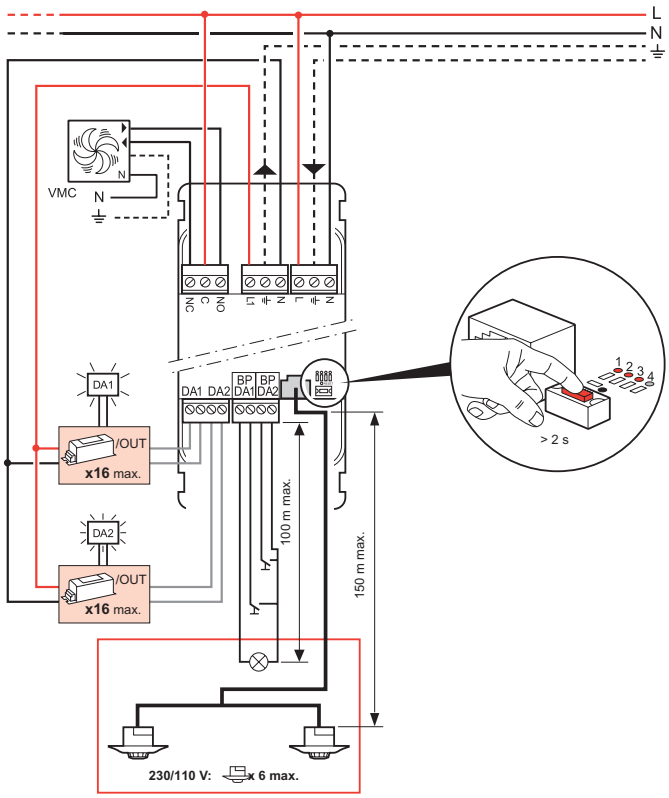
Operation in modes 1, 2, 3 and 5
In modes 1, 2, 3 and 5, output 2 copies output 1 with an offset.

In modes 1, 2 and 3, output 2 will only switch off at the end of presence (channel 2 in mode 1: min. value 30%
channel 2 in mode 2: min. value 50%
channel 2 in mode 3: min. value 80%)
In mode 5, output 2 will switch off at the end of presence or when the light level is adequate

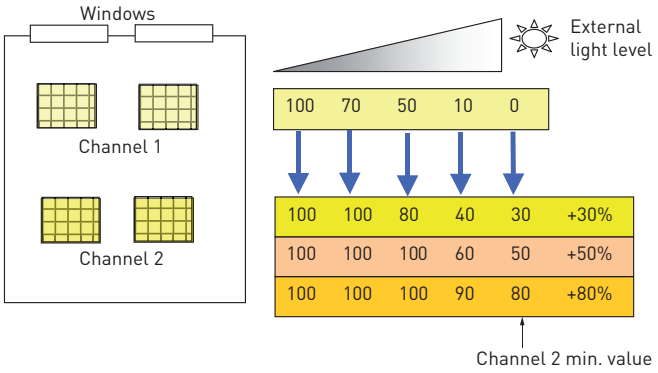
Meaning of the LEDs:
Modes 1, 2 and 3 are used to manage a window side and a corridor side, giving a light level offset between the two sides. Mode 5 is used to maintain lighting in areas surrounding the work area.

Mode	LED number				Operating mode
1	**1**	2	3	4	Corridor side = window side +30%
2	**1**	**2**	3	4	Corridor side = window side +50%
3	**1**	**2**	**3**	4	Corridor side = window side +80%
4	1	**2**	3	4	Public buildings
5	1	2	**3**	4	Surrounding area (2/3)

The lighting output can control the power of the ballasts of both channels.



The role of the controller in these 3 modes is to give a difference in light level between the window side and the corridor side. A difference of +30%, +50% or +80% can be chosen for the corridor side. Example of an office:

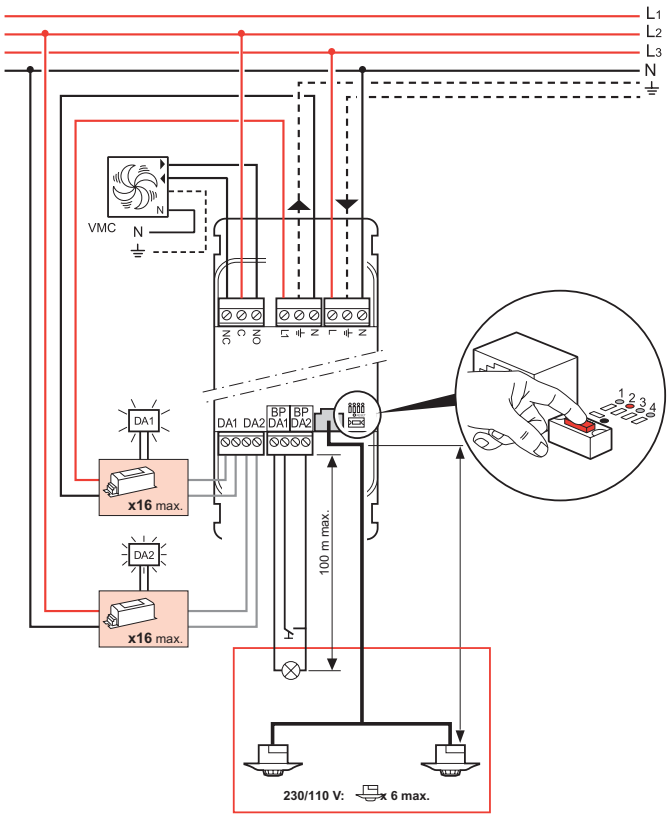


It is possible to override automatic mode linking the two channels by using the pushbuttons. The resulting behaviour is given in the following table:

Channel status	Automatic mode status	Press on pushbutton	Channel no.	Behaviour
OFF	ON or OFF	Short press	1	Both sides switched on and activation of automatic mode The regulation system is activated
ON	ON	Short press	1	Both sides switched off and deactivation of automatic mode The regulation system is deactivated
ON	OFF	Short press	1	Channel 1 switched off The regulation system is deactivated
OFF/ON	ON or OFF	Pressed and held down	1	Dimming of channel 1 and deactivation of automatic mode The regulation system is deactivated
OFF	ON or OFF	Short press	2	Channel 2 switched on and deactivation of automatic mode
ON	ON or OFF	Short press	2	Channel 2 switched off and deactivation of automatic mode
OFF/ON	ON or OFF	Pressed and held down	2	Dimming of channel 2 and deactivation of automatic mode

In these 4 modes, there must be two pushbuttons to control each channel.

Mode 4 operation (public buildings)



Mode 4 is optimised for public buildings.

The two channels constantly follow each other, which enables the luminaires to be placed in staggered rows with one supply phase for the various ballasts on each channel.

If the controller fails, the level of the DALI ballasts will be maintained, and if the BUS is disconnected, each ballast will switch to protected mode and will switch on its load at 100%. In addition, if one phase is cut, the room will not be in darkness.

Manual lighting controls can be placed in a room that is not accessible to the public. These controls can have an indicator (Cat. No. 0 676 67) to indicate the state of the lighting.

In this operating mode, the relay controlling the power of the ballasts must only be associated with one channel.

Mode 4 operation (public buildings) (continued)

The two DALI/DSI channels cannot be separated by the auxiliary inputs. It is possible to override automatic mode linking the two channels by using the pushbuttons. The resulting behaviour is given in the following table:

Channel status	Press on pushbutton	Channel no.	Behaviour
OFF	Short press	1 or 2	Both channels switched on The regulation system is activated
ON	Short press	1 or 2	Both channels switched off The regulation system is deactivated
OFF/ON	Pressed and held down	1 or 2	Both channels dimmed The regulation system is deactivated

Several sensors can be installed (up to 6 sensors). The RJ45-BUS/SCS connector 0 488 72 or the RJ45 double connector 0 488 68 can be used to connect all the sensors.

The distance between the controller and the furthest sensor is limited to 150 m.

Using the auxiliary inputs:

Type of press	Behaviour
Short press (< 400 ms)	If the load is on: The load switches off If the load is off: The load switches on
Long press (> 400 ms)	The brightness of the load increases or decreases. Each time it is pressed the dimming type is reversed. If the load is off, the first dimming type is increasing brightness.

An IR remote control can be used (Cat. No. 0 882 31) to control both channels. When the remote control is in factory mode, unit 1 controls channel 1 and unit 2 controls channel 2.

Configuring the controller:

Each time the mains power is switched on, the controller carries out a Plug&Go procedure, i.e. it scans the sensors on the BUS SCS then configures them if they are not configured. It remains possible to reset all the sensors as follows:

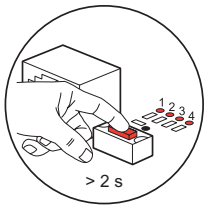
- Short press on the controller's pushbutton. The Reset LED blinks slowly.
- Long press on the pushbutton. After 10 s the Reset LED starts to flash. The controller deletes all the sensors connected to it, then reconfigures itself and the sensors.
- When the Reset LED goes off, the system is ready to operate.

The sensors are configured in walkthrough mode, with a 15 minute time delay and a light level threshold of 500 lux. These parameters can, of course, be fully customised by the installer using the configuration tool 0 882 30.

Selecting the operating mode of the controller:

The controller's operating mode can be changed using its pushbutton.

A long press (> 400 ms) on the pushbutton is used to scroll through the operating modes. The modes are indicated using 3 LEDs, marked 1 to 3.



When the button has been pressed for 2 s, the LEDs start to blink, indicating that the controller is switching to parameter setting mode. Then a different mode is offered every 4 s. When you reach the desired mode, simply release the pushbutton. When the LEDs stop blinking, the new mode has been selected.

0 488 52 – CONTROLLER WITH 2 0-10 V OUTPUTS

Controller 0 488 52 is used to control one or more 0-10 V ballasts on two separate channels. It has one relay output per channel for controlling the power of the 0-10 V ballasts.

The controller has a status memory, so that when the mains power returns, it will return to the status it was in before the break for both 0-10 V channels. If the controller has a sensor and there is no-one present after the mains power returns, the system will switch off at the end of the time delay.

Bistable relays are used, thus providing additional savings. To protect the relays and optimise their service life, the controller has a system for closing the relay contacts that is synchronised with the switch to zero current.

Two mechanical pushbuttons can be connected for separate manual control of the two 0-10 V channels.

If there is only one pushbutton, it must be connected to channel 1 only. This pushbutton will provide ON/OFF control of both channels but will only dim channel 1 (stopping synchronisation between the two outputs).

A short press on the channel 1 pushbutton will restart automatic mode and synchronisation of the two channels.

The two outputs, BP1 and BP2, must not be wired on a single pushbutton

Controller 0 488 52 has 5 operating modes:

- Mode 1: 2 0-10 V outputs with a 30% offset
- Mode 2: 2 0-10 V outputs with a 50% offset
- Mode 3: 2 0-10 V outputs with an 80% offset
- Mode 4: 2 0-10 V outputs with no offset (special mode for public buildings)
- Mode 5: 2 0-10 V outputs with a 2/3 offset

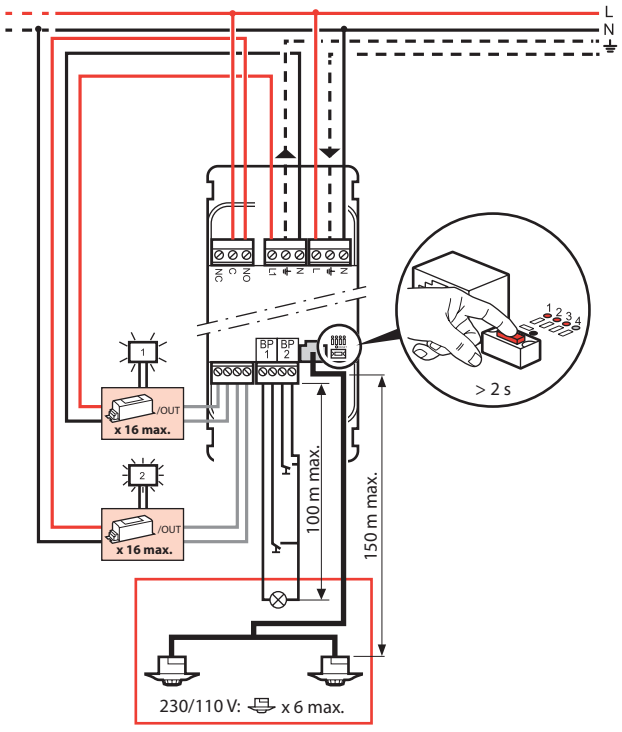
Operation in modes 1, 2, 3 and 5

In modes 1, 2, 3 and 5, output 2 copies output 1 with an offset.

In modes 1, 2 and 3, output 2 will only switch off at the end of presence (channel 2 in mode 1: min. value 30%
channel 2 in mode 2: min. value 50%
channel 2 in mode 3: min. value 80%)
In mode 5, output 2 will switch off at the end of presence or when the light level is adequate

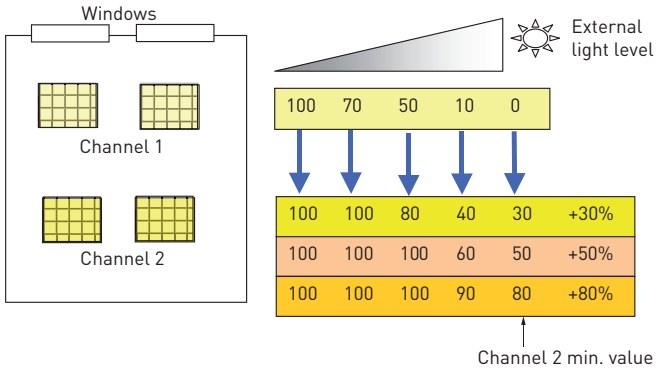
Meaning of the LEDs:
Modes 1, 2 and 3 are used to manage a window side and a corridor side, giving a light level offset between the two sides. Mode 5 is used to maintain lighting in areas surrounding the work area.

Mode	LED number				Operating mode
1	**1**	2	3	4	Corridor side = window side +30%
2	**1**	**2**	3	4	Corridor side = window side +50%
3	**1**	**2**	**3**	4	Corridor side = window side +80%
4	1	2	3	4	Public buildings
5	1	2	**3**	4	Surrounding area (2/3)



Operation in modes 1, 2, 3 and 5 (continued)

The role of the controller in these 3 modes is to give a difference in light level between the window side and the corridor side. A difference of +30%, +50% or +80% can be chosen for the corridor side. Example of an office:

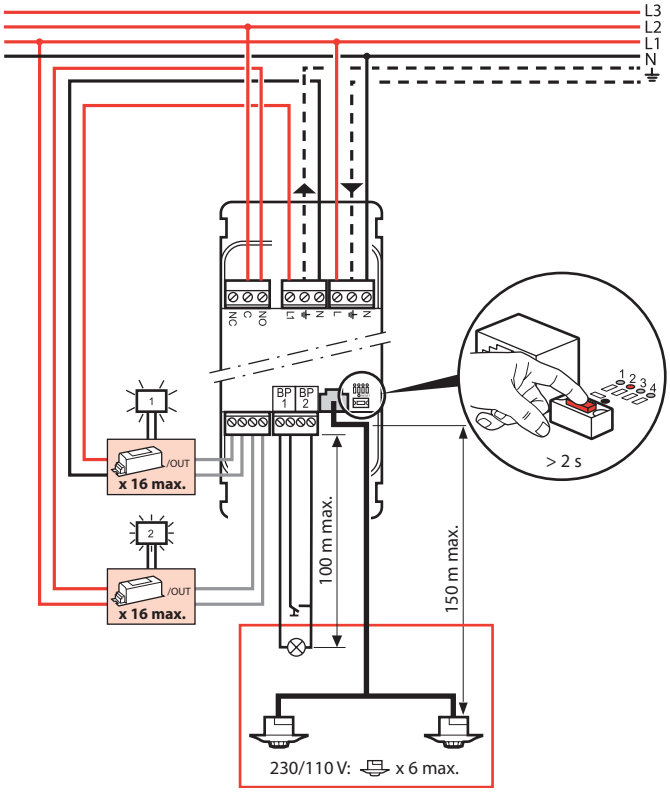


It is possible to override automatic mode linking the two channels by using the pushbuttons. The resulting behaviour is given in the following table:

Channel status	Automatic mode status	Press on pushbutton	Channel no.	Behaviour
OFF	ON or OFF	Short press	1	Both sides switched on and activation of automatic mode The regulation system is activated
ON	ON	Short press	1	Both channels switched off and deactivation of automatic mode The regulation system is deactivated
ON	OFF	Short press	1	Channel 1 switched off The regulation system is deactivated
OFF/ON	ON or OFF	Pressed and held down	1	Dimming of channel 1 and deactivation of automatic mode. The regulation system is deactivated
OFF	ON or OFF	Short press	2	Channel 2 switched on and deactivation of automatic mode
ON	ON or OFF	Short press	2	Channel 2 switched off and deactivation of automatic mode
OFF/ON	ON or OFF	Pressed and held down	2	Dimming of channel 2 and deactivation of automatic mode

In these 4 modes, there must be two pushbuttons to control each channel.

Mode 4 operation (public buildings)



Mode 4 is optimised for public buildings.
The two channels constantly follow each other, which enables the luminaires to be placed in staggered rows with one supply phase for the various ballasts on each channel.
If the controller fails, the level of the 1-10 V ballasts will be maintained, and if the BUS is disconnected, each ballast will switch to protected mode and will switch on its load at 100%. In addition, if one phase is cut, the room will not be in darkness.
Manual lighting controls can be placed in a room that is not accessible to the public. These controls can have an indicator (Cat. No. 0 676 67) to indicate the state of the lighting.

The two 1-10 V channels cannot be separated by the auxiliary inputs. It is possible to override automatic mode linking the two channels by using the pushbuttons. The resulting behaviour is given in the following table:

Channel status	Press on pushbutton	Channel no.	Behaviour
OFF	Short press	1 or 2	Both channels switched on The regulation system is activated
ON	Short press	1 or 2	Both channels switched off The regulation system is deactivated
OFF/ON	Pressed and held down	1 or 2	Both channels dimmed The regulation system is deactivated

Several sensors can be installed (up to 6 sensors). The RJ45-BUS/SCS connector 0 488 72 or the RJ45 double connector 0 488 68 can be used to connect all the sensors.

The distance between the controller and the furthest sensor is limited to 150 m

Using the auxiliary inputs:

Type of press	Behaviour
Short press (< 400 ms)	If the load is on: The load switches off If the load is off: The load switches on
Long press (> 400 ms)	The brightness of the load increases or decreases. Each time it is pressed the dimming type is reversed. If the load is off, the first dimming type is increasing brightness.

An IR remote control can be used (Cat. No. 0 882 31) to control both channels. When the remote control is in factory mode, unit 1 controls channel 1 and unit 2 controls channel 2.

Configuring the controller:

Each time the mains power is switched on, the controller carries out a Plug&Go procedure, i.e. it scans the sensors on the BUS SCS then configures them if they are not configured.

It is still possible to reset all the sensors as follows:

- Short press on the controller's pushbutton. The Reset LED blinks slowly.
- Long press on the pushbutton. After 10 s the Reset LED starts to flash. The controller deletes all the sensors connected to it, then reconfigures itself and the sensors.
- When the Reset LED goes off, the system is ready to operate.

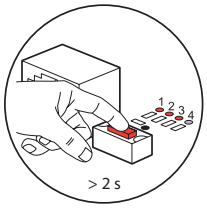
The sensors are configured in walkthrough mode, with a 15 minute time delay and a light level threshold of 500 lux. These parameters can, of course, be fully customised by the installer using the configuration tool 0 882 30.

Selecting the operating mode of the controller:

The controller's operating mode can be changed using its pushbutton.

A long press (> 400 ms) on the pushbutton is used to scroll through the operating modes. The modes are indicated using 3 LEDs, marked 1 to 3.

When the button has been pressed for 2 s, the LEDs start to blink, indicating that the controller is switching to parameter setting mode. Then a different mode is offered every 4 s. When you reach the mode you want, simply release the pushbutton. When the LEDs stop blinking, the new mode has been selected.

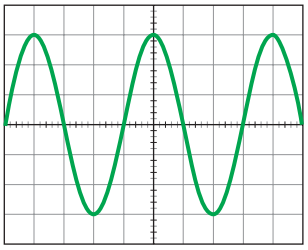


ZERO CURRENT BREAKING

In order to limit the incidence of currents on the cut-off relays, induced by fluorescent loads in particular, all Legrand sensors break at zero current.

Description: the AC input and output signal is a sine wave. The input and output are supplied by the same phase and are consequently synchronised.

The sensor observes the sine wave of the input signal. As soon as it receives a switch-off command to be carried out, it waits for the sine wave of the input signal to change to zero and breaks the current to the load.



Value 0

REMOTE CONTROLS

USING REMOTE CONTROLS WITH A SENSOR

Compatibility of remote controls

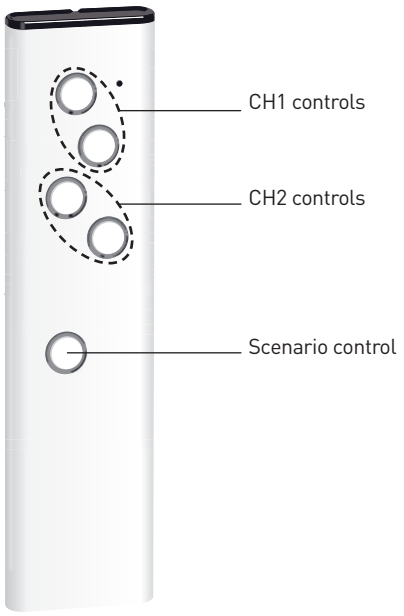
- **BUS sensors:**
  These are compatible with the following remote controls:
  Cat. Nos 0 882 31.
  Only the remote control without scenario, Cat. No. 0 882 31, is covered in this manual.
  The others are scenario remote controls which are only of use in a system: this programming mode is described in the SCS system guide.
- **Sensor switches:**
  These are compatible with remote control Cat. No. 0 882 31.



Programming

The Push&Learn programming method is used.

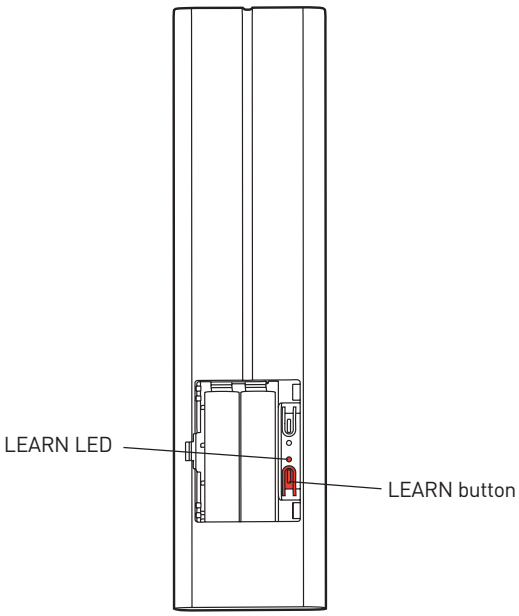
These remote controls comprise ON/OFF channels. The aim is to program the ON button for the channel, and the OFF button will be programmed automatically.



Push&Learn procedure:

- Press the Learn button on the remote control
- Press the Learn button on the sensor
- Press the Learn button on the sensor (x 2)
- Press the Learn button on the remote control

The ON and OFF buttons are both programmed.



Factory mode:

Status of the remote control on delivery or following a reset

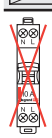
- With 1 switch sensor: CH1 will control the sensor (NB: it will also control that of the neighbouring office is there is a window. To avoid this, a Push&Learn procedure must be carried out between the remote control and the sensor)
- With 1 BUS sensor + stand-alone controller:
  - CH1 will control the window side (output 1)
  - CH2 will control the corridor side (output 2)

BEHAVIOUR OF THE SENSOR AND CONTROLLER

AUTOMATIC ON - AUTOMATIC OFF MODE

 **1 person enters**	There is enough light	• No effect	• No effect
	The light level is inadequate	• Activates the loads immediately • Switches on regulation	• Immediately activates the loads at the level prior to switch-off (if the previous level is too low, the loads are activated at 70% of their maximum power) • Switches on regulation
 **1 person remains**	The sensor regulates, the room gets darker	• If the light is off, activates the loads immediately • If the light is on, no effect	• If the light is off, activates the loads immediately at the previous level • If the light is on, immediately increases the lighting power
	The sensor regulates, the room gets lighter	• If the light level is above the threshold, the loads switch off after 10 min • If the light level is below the threshold, no effect	• The power is reduced to the chosen level (the reduction is gradual = 1% per min) (if there is a considerable difference in light level, this can take more than an hour)
	The light is on, short press on manual control	• OFF command: all the loads are switched off immediately • ON command: switches on regulation	• OFF command: all the loads are switched off immediately • ON command: switches on regulation
	The light is on, long press on manual control	• Switches off regulation • No effect on the loads	• Switches off regulation • Increases or decreases the lighting power immediately
	The light is off, short press on manual control	• OFF command: switches off regulation • ON command: switches on regulation with immediate switch-on of lighting	• OFF command: switches off regulation • ON command: switches on regulation and switches on the loads at the previous level
	The light is off, long press on manual control	• Switches off regulation • Switches on the loads	• Switches off regulation • Switches on the loads and manages dimming with more or less lighting power
 **The person leaves**		• Switches off the loads and switches off regulation after the set time delay	• Switches off the loads and switches off regulation after the set time delay
 **Mains failure**		• The controllers memorise their status	• The controllers memorise their status
 **Power return**		• The controllers return to the status they were in before the mains failure • Regulation remains off • The time delay starts • If no presence is detected = switch-off after time delay	• The controllers return to the status they were in before the mains failure • Regulation is switched off • The time delay starts • If no presence is detected = switch-off after time delay

MANUAL ON - AUTOMATIC OFF MODE

 **1 person enters**	There is enough light	• No effect	• No effect
	The light level is inadequate	• No effect until the manual control is pressed	• No effect until the manual control is pressed
 **1 person remains**	The sensor regulates, the room gets darker	• If the light is off, activates the loads immediately • If the light is on, no effect	• If the light is off, activates the loads immediately at the previous level • If the light is on, immediately increases the lighting power
	The sensor regulates, the room gets lighter	• If the light level is above the threshold, the loads switch off after 10 min • If the light level is below the threshold, no effect	• The power is reduced to the chosen level (the reduction is gradual = 1% per min) (if there is a considerable difference in light level, this can take more than an hour)
	The sensor does not perform any regulation and the room gets darker	• No effect	• No effect
	The sensor does not perform any regulation and the room gets lighter	• No effect	• No effect
	The light is on, short press on manual control	• OFF command: all the loads are switched off immediately • ON command: switches on regulation	• OFF command: all the loads are switched off immediately • ON command: switches on regulation
	The light is on, long press on manual control	• Switches off regulation • No effect on the loads	• Switches off regulation • Increases or decreases the lighting power immediately
	The light is off, short press on manual control	• OFF command: switches off regulation • ON command: switches on regulation with immediate switch-on of loads	• OFF command: switches off regulation • ON command: switches on regulation with the loads switched on at the previous level
	The light is off, long press on manual control	• Switches off regulation • Switches on the loads	• Switches off regulation • Switches on the loads and manages dimming with more or less lighting power
 **The person leaves**		• Switches off the loads and switches off regulation after the set time delay	• Switches off the loads and switches off regulation after the set time delay
 **Mains failure**		• The controllers memorise their status	• The controllers memorise their status
 **Power return**		• The controllers return to the status they were in before the mains failure • Regulation remains off • The time delay starts • If no presence is detected = switch-off after time delay	• The controllers return to the status they were in before the mains failure • Regulation remains off • The time delay starts • If no presence is detected = switch-off after time delay

BEHAVIOUR OF SEVERAL SENSORS WITH ONE PUSHBUTTON

L1 D1
L2 D2
Ln Dn

SEVERAL SENSORS AND LOADS

<table>
<tr><th>Status</th><th>Actions</th><th>Result</th></tr>
<tr><td colspan="2">All the loads and sensors are off</td><td rowspan="2">Short press on pushbutton  < 1 s</td><td rowspan="2">All the loads and sensors switch on</td></tr>
<tr><td>L1 OFF
L2 OFF
Ln OFF</td><td>D1 OFF
D2 OFF
Dn OFF</td></tr>
<tr><td colspan="2">All the loads and sensors are on</td><td rowspan="2">Short press on pushbutton  < 1 s</td><td rowspan="2">All the loads and sensors switch off</td></tr>
<tr><td>L1 ON
L2 ON
Ln ON</td><td>D1 ON
D2 ON
Dn ON</td></tr>
<tr><td colspan="2" rowspan="3">The load and sensor 1 are on and the other 2 (2 and n) are off
L1 ON D1 ON
L2 OFF D2 OFF
Ln OFF Dn OFF</td><td>Short press on pushbutton  < 1 s</td><td>The load and sensor 1 switch off and the other 2 (2 and n) switch on</td></tr>
<tr><td>Long press on pushbutton  > 1 s
and
short press on pushbutton  < 1 s</td><td>All the loads and sensors switch off</td></tr>
<tr><td>Long press on pushbutton  > 1 s</td><td>All the loads and sensors switch on</td></tr>
</table>



SEVERAL SENSORS AND ONE LOAD

Status		Actions	Result
The load and all the sensors are off		Short press on pushbutton < 1 s	**The load and all the sensors switch on**
L OFF	D1 OFF D2 OFF Dn OFF		
The load and all the sensors are on		Short press on pushbutton < 1 s	**The load and all the sensors switch off**
L ON	D1 ON D2 ON Dn ON		
The load and sensor 1 are on and the other 2 (2 and n) are off		Short press on pushbutton < 1 s	**Sensor 1 switches off; the load remains on and the 2 other sensors switch on (2 and n)**
L ON	D1 ON D2 OFF Dn OFF	Long press on pushbutton > 1 s and short press on pushbutton < 1 s	**The load and all the sensors switch off**
		Long press on pushbutton > 1 s	**The load and all the sensors switch on**

COMMISSIONING WITH SENSOR CONFIGURATION TOOL

Check the wiring → Interrogate the sensor → Set the sensor → Check the operation

REMINDER OF THE INSTALLATION RULES

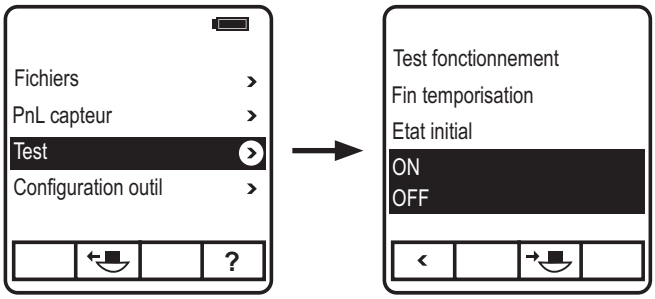
Before a sensor is set, it must be wired in accordance with the wiring instructions supplied with the sensor.
For BUS sensors, the system configuration must have been completed.
This procedure is applicable to BUS, stand-alone or ZigBee radio sensors.
A configuration tool (0 882 30) is required for setting the sensors.
Tool 0 882 35 can be used to set the basic parameters: time delay, operating mode, sensitivity and light level threshold.
But it cannot be used for troubleshooting the sensor if there is a problem.

Setting a BUS sensor via a configuration tool is not compatible with programming using configurators.

To obtain more information on the operation of the configuration tool 0 882 30, please refer to the technical data sheet on www.legrandoc.com.

CHECKING THE WIRING

To check the wiring, switch on the installation: the sensor must switch on its load for approximately 30 seconds depending on the type (BUS, stand-alone or ZigBee radio): this step is called the warm-up.



Use the configuration tool 0 882 30 and go to the **test** menu, then control the load using the **ON** and **OFF** functions.

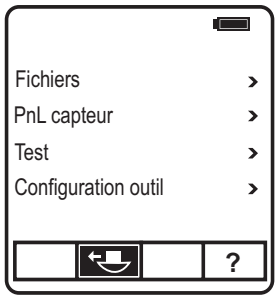
If there is a local control (pushbutton, touch screen, infrared remote control, etc.), use it and check control of the load.

If the loads do not respond, check with the installer to locate the wiring error.

Check the wiring → **Interrogate the sensor** → Set the sensor → Check the operation

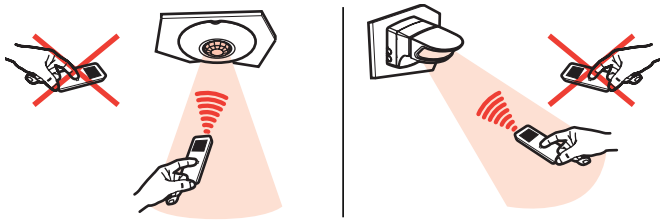
INTERROGATING THE SENSOR

After validating the wiring, the sensor must be interrogated.



In the main menu, click on the icon  at the bottom of the window, using the buttons at the bottom of the screen

It is necessary to comply with the positioning instructions so that the tool can communicate with the sensor.



To have good communication between the 0 882 30 tool and the sensor, it is sometimes necessary to switch off the light first, as fluorescent lights can disturb or even prevent communication.

As tool Cat. No. 0 882 30 is common to several product ranges, when all the parameters are read, those which are not used in the product being interrogated are filtered out. Only the menus and commands which are compatible with that product will be visible in the tool.
List of parameters (when reading a sensor in an office - 0 488 22 - dual technology BUS sensor).

0 h 15 min 0 sec	Time delay
PIR Medium	IR sensitivity
US Medium	US sensitivity
250 lux	Light level threshold
Auto ON/OFF	Operating mode
Initial > IR and US	Initial detection system
Maintain > IR or US	Maintain detection system
Restart > deactivated	Restart detection system
Deactivate	Alarm
Activate	Regulation
Auto	Additional light
Closed loop	Automatic control
Digital PIR+US	Type of sensor
0x00055F16	ID no.
1.17	Firmware version
7	Address A = 0, Pl = 7
7	Group no.

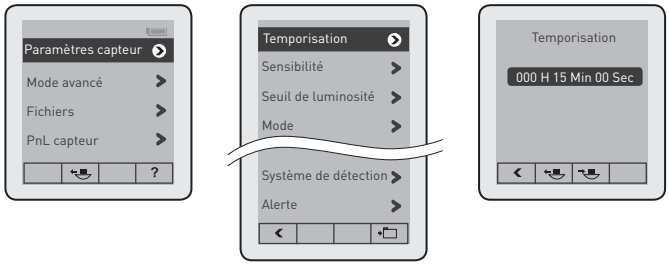


SETTING THE SENSOR

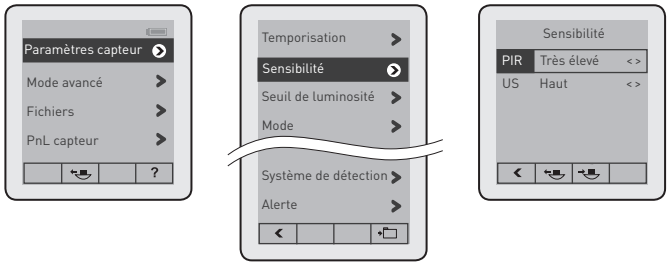
Sensors are set in two steps: the detection function and the regulation function.

1. Setting the parameters connected with detection

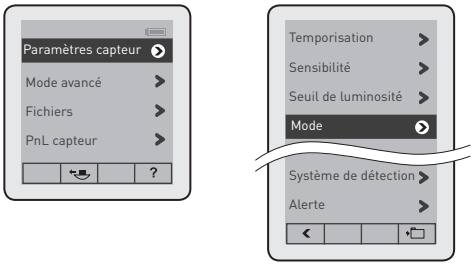
- **Time delay**: time the lighting remains on after the last detection. In a commercial building, it is advisable to set long time delays (between 10 and 15 min) to avoid premature wear of the fluorescent tubes and unwanted switching off (in particular when working at a desk and only making small movements, or possibly not moving at all, for example when reading documents).

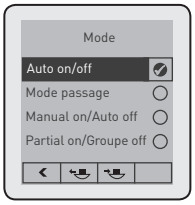


- **Sensitivity**: for each technology (IR and US), the sensitivity setting decreases or increases the detection area.
  It also reduces the disturbing effects of air currents, air conditioning and air flows from heating, etc.
  To set the sensitivity levels, it is advisable to go to Operating Test mode (p. 28).
  Go to the detection area and check that the sensor covers the strategic positions in the room (entrance door, desk, etc.).
  A detection LED lights in the lens to indicate that the sensor is detecting.

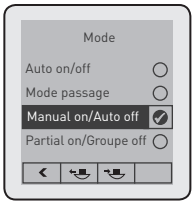


- **Operating mode**: used to select the required operating mode (auto ON/OFF; manual ON/auto OFF; walk-through, etc.).

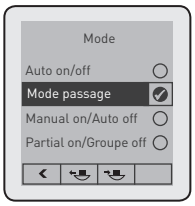




Automatic ON/OFF mode: Automatic switch-on if light level inadequate, automatic switch-off after time delay or if the light level is adequate.



Manual ON/Auto OFF mode: Manual switch-on using local control, automatic switch-off after time delay or if the light level is inadequate.

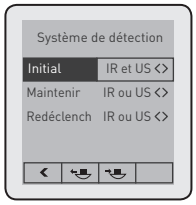


Walk-through mode: same as automatic ON/OFF mode, except if there is no detection after 20 s the time delay is reduced to 3 min.

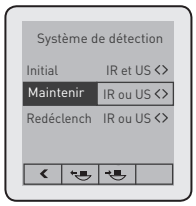
■ **Detection system**: (only used with dual technology sensors): used to define the detection technology used for each phase:



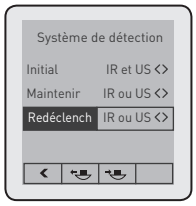




Initial = when you enter the room (by default, set IR and US)



Maintain = when you remain in the room (by default, set IR or US)

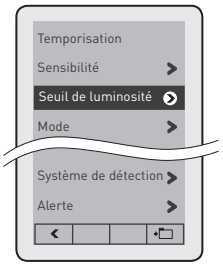


Restart = in manual ON/auto OFF mode, when you remain in a room without moving and the light switches off, switches the light back on again automatically for 30 seconds after switch-off.
By default, set IR or US (deactivate if the operating mode is not manual ON/Auto OFF).

2. Setting the parameters associated with lighting regulation

■ **Light level threshold**: minimum lighting value when presence is detected.
The light level threshold setting will depend on the type of area => standard EN 15 193 gives recommended values for each type of use (example: 500 lux for offices, 150 lux for passageways, etc.).





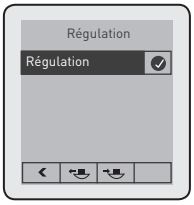


■ **Regulation**: if this is activated, the sensor constantly adapts the artificial light according to the natural light.
If this is deactivated, the sensor tests the light level when the first detection occurs but does not adapt to the external light thereafter.

For rooms with natural light, activate regulation.









SETTING THE SENSOR (CONTINUED)

■ **Additional light**: corresponds to the amount of artificial light provided (for a dimmer = amount of light when the luminaires are on 100%).

It represents the amount of artificial light. Legrand recommends that this is set to auto (value 0). The sensor will then calculate the amount of artificial light by itself. This calculation is updated regularly. In dimming mode this compensates for the wear of the tubes and maintains the lighting at a constant level. The dimmer program takes the maximum value, i.e. the load at 100%.







■ **Automatic control**:
- Closed loop = the sensor uses the measurement (in lux) from its own light level sensor
- Open loop = the sensor uses the measurement (in lux) from a remote sensor (light level cell)

If there is no light level cell, set the sensor to Closed loop.







■ **Calibration**:
Calibration is used to adjust the light level measurement according to the environment. The environment (colour of the floor, the walls, etc.) affects the amount of light seen by the sensor.
This function is only used for areas with precise lighting requirements (laboratories, clean rooms, etc.). This parameter can only be modified using a luxmeter (expert mode p. 31).

As soon as you have modified a parameter, send it to the sensor before moving on to the next parameter (if you carry out the whole configuration on the tool and then send it to the sensor, only the last parameter will be sent).



■ **Special cases**

1. Setting the parameters associated with lighting regulation

The sensor can be configured as a motion sensor (it will not take the light level into account even when the first detection occurs).
- Stand-alone sensor: set the Light level threshold parameter to maximum (1275 lux)
- BUS sensor: change the sensor type via the Virtual Configurator configuration software

2. Setting the light level threshold "by eye"

The sensor's light level threshold can be configured at the ambient light level: eye function.

1. Adjust the ambient light level (light off) to the required level (using awnings or blinds, or waiting for the right level of natural light)
2. Set the light level threshold to 0 on the configuration tool 0 882 30, the icon appears on the screen
3. Send the command by pressing the button

This procedure can be used to set an actual light level (seen by the installer) rather than numerical values.
It also enables the same ambient light level to be given for all sensors in a room with several sensors, independently of their locations, which may have different light levels.

Caution: the human eye is not a luxmeter. It adapts to the ambient light level. Also, the eye is not at the same level as the sensor.

Example: a corridor with windows at mid-height:

■ The eye will receive a great deal of light from outside via the horizontal beams entering through the windows.

■ The natural light, in the form of horizontal beams, does not reflect on the floor and does not light the ceiling, the sensor therefore does not see the external light.

→ Consequently the sensor will switch on even when there is a great deal of natural light.

COMMISSIONING WITH SENSOR CONFIGURATION TOOL



SETTING OTHER PARAMETERS

■ **File**:
After reading the sensor's parameters, the icon can be used to save the complete configuration.



The file menu is used to manage complete saves of a sensor's settings:
Display the content of the file
Send the configuration contained in the file to the sensor
Delete the file

■ **PnL sensor**



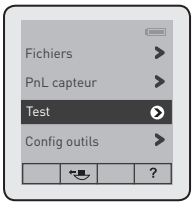
This mode requires there to be an SCS system. It will be described in the SCS system guide.

■ **Tool config**



This menu is used to:
- Change the language
- Check the version of the remote control
- Check the load status of the battery

■ **Test**
This menu enables various tests to be performed to validate or troubleshoot the sensor's settings.



Operating test: this mode deactivates light level measurement and sets the time delay to its minimum value, for 5 min. This mode is useful for setting the sensitivity (this function is also available on the configuration tool 0 882 35 - Test button).

End of time delay: this mode ends the current time delay. It is useful for checking what happens at the end of a time delay (in particular switch-off of loads).

Initial state: this is used, after each configuration phase, to validate the modified parameters in order to test the new configuration. (Initial state is equivalent to leaving the room, waiting for the end of the time delay, then re-entering the room).

ON/OFF command: these two commands are used to control the loads in order to check the wiring.

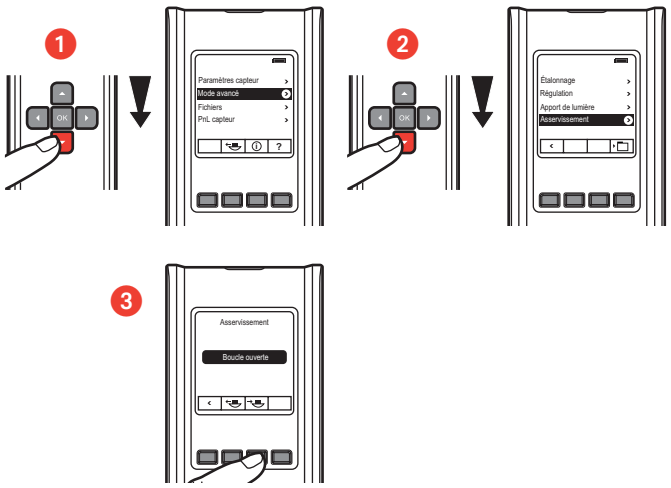




OPEN LOOP PROGRAMMING WITH LIGHT LEVEL CELL

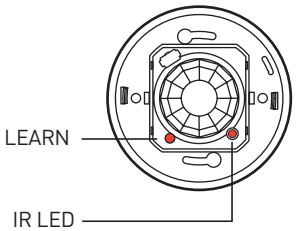
This programming is used to associate "x" sensors with 1 light level cell.
The steps in this association procedure are as follows:

■ 1. Using the configuration tool, set the sensors to **open loop mode**



■ 2. Perform a Push&Learn procedure:
a) Short press (< 1 second) on the Learn button on the light level cell
b) 2nd short press (< 1 second) on the Learn button on the light level cell
c) Short press (< 1 second) on the Learn button on sensor no. 1
d) 2nd short press (< 1 second) on the Learn button on sensor no. 1
e) Repeat steps c and d for each sensor to be associated
f) Short press (< 1 second) on the Learn button on the light level cell

When the LEDs stop blinking association is complete.



■ 3. Once the sensors have been associated, adjust the calibration of the sensors
1) Switch off the light loads (test/OFF)
2) Measure the light level at the strategic locations (for each area) using a luxmeter, take the average and send the value to the sensor in Advanced mode/Calibration
3) Repeat the procedure for each sensor



CHECKING THE OPERATION

■ **Checking the detection**
(using configuration tool Cat. No. 0 882 30).

1. Click on **Operating test**.
   If the tests are not finished after 5 min, restart **Operating test**
2. Go and stand at the edges of the room (or at strategic locations such as the desk and the entrance door)
3. Move, and check that the detection LED and the loads switch on (the LED is in the sensor's lens)

Repeat steps 2 to 3 for each strategic position.
Also check that the sensor is only detecting in the required areas (for example, the sensor must not detect someone passing by in the corridor).
To adapt the detection area, change the IR and/or US sensitivity (if necessary, change the position of the sensor).

4. When all the positions have been checked, send **Initial state**. Wait 5 s and move so that you are detected. The light should switch on.
5. Leave the room and wait for the light to switch off (this must take no more than 40 s)

At this stage, the detection parameters are set.

■ Checking the lighting regulation
(using configuration tool Cat. No. 0 882 30).

The regulation curves (in ON/OFF mode and in dimming mode) are defined so as not to disturb the users of the areas and to maintain the service life of the fluorescent tubes.
It is therefore difficult to give a quick visual demonstration of how the regulation is working:

- **In ON/OFF mode: the sensor will wait for the light level threshold to be exceeded for 10 min before switching off**
- **In dimming mode: the lighting is dimmed very slowly (1% per minute). It is not visible to the naked eye. It will therefore take 1 h 30 min to decrease from 100% to 10%.**

By contrast, the response time for switching the light on is very quick, so that people are not left in the dark. This is what will be checked.



1: Room with awning or blind/natural light above the threshold

1. Open the blinds
2. Send **Initial state** then move: the light must not switch on
3. Close the blinds: the light should switch on in 2 s

2: Room with no awnings or blinds/natural light above the threshold

1. Send **Initial state** then move: the light must not switch on
2. Place your hand or a cover in front of the sensor: the light should switch on

3: Natural light below the threshold

1. Send **Initial state** then move: the light should switch on
2. Provide an independent light source (torch, inspection lamp, portable floodlight, etc.) and shine it towards the sensor
3. With ON/OFF luminaires: wait for 10 min, the light should switch off
   With dimmable luminaires: return 10 to 15 min later, the light should no longer be 100%

Set a time delay of more than 30 min if no-one remains in the room to be detected.

At this stage, the lighting regulation parameters are set.

TROUBLESHOOTING THE SENSOR

Unwanted switch-on: With a dual technology sensor

→ Malfunction connected with detection
→ Parameters to be modified:
Time delay
Sensitivity
Detection system

STEP 1: IDENTIFY THE TECHNOLOGY WHICH IS DISTURBED

1. Set the time delay to 30 s
2. In the detection system, set the 3 phases (initial, maintain and restart) in US only
3. Send **Initial state** and exit the detection area

If the problem persists, it is the US technology which is disturbed

If the problem has disappeared:

1. In the detection system, set the 3 phases (initial, maintain and restart) in IR only
2. Send **Initial state** and exit the detection area

If the problem persists, it is the IR technology which is disturbed

STEP 2: RESOLVE

1. Return the detection system to the factory settings (initial = IR and US; maintain = IR or US; restart = IR or US)
2. Reduce the sensitivity of the disturbed technology in steps
3. Send **Initial state** then leave the room between every two tests

STEP 3: FURTHER ACTIONS, IF NECESSARY

1. Modify the detection system in order to make detection more robust (initial = IR and US; maintain = IR and US; restart = deactivated) or disable the disturbed technology, switching to IR only or US only in initial and maintain.
2. If the malfunction persists, the sensor must be moved away from the source causing the disturbance (air flow from heating or air conditioning, etc.)
3. Return the time delay to the value required in the Special Technical Specifications

Unwanted switch-on: With a single technology sensor

→ Malfunction connected with detection
→ Parameters to be modified:
Time delay
Sensitivity

STEP 1: RESOLVE

1. Set the time delay to 30 s
2. Reduce the sensitivity in steps
3. Send **Initial state** then leave the room between every two tests
4. If the malfunction persists, the sensor must be moved away from the source causing the disturbance (the sensor must not be installed in an air flow from heating or air conditioning)
5. Return the time delay to the value required in the Special Technical Specifications

The light switches on when presence is detected even though the light level is adequate.

→ Malfunction connected with the lighting regulation
→ Parameters to be modified:
Light level threshold

STEP 1: RESOLVE

1. Reduce the light level threshold
2. Send **Initial state**
3. Wait 5 s then move so that you are detected
4. Repeat until the light no longer switches on

Special case (Expert mode):
Resolve without altering the light level threshold (Some design offices/installers wish to comply with the set lux value given by the Special Technical Specifications. In this case, the sensor must be recalibrated.
- Expert mode with luxmeter)

Calibration in rooms with blinds

1. Switch off the light
2. Measure the light level at the strategic locations in the sensor's measurement area using a luxmeter
3. Take an average
4. Send the value in **Advanced mode\Calibration**
5. Switch on the light and close the blinds (or wait for night-time)
6. Measure the light level at the same strategic locations
7. Take an average
8. Send the value in **Advanced mode\Calibration**
9. Send **Initial state**

If the calibration of the sensor has been changed too much and the installer gets lost in the settings, return the sensor to factory settings by a short press followed by a long press (approximately 10 s) on the sensor's Learn button

Calibration in rooms without blinds

Please contact your Legrand sales office

TROUBLESHOOTING THE SENSOR

The light switches off when presence is detected even though the light level is inadequate.

→ Malfunction connected with detection
→ Parameters to be modified:
Sensitivity
Time delay

SOLUTION 1

- Increase the sensitivity in steps (send **Initial state** between each test).

SOLUTION 2

- Increase the time delay.
  For work areas, Legrand recommends time delays of between 10 and 15 min (send **Initial state** between each test).

SOLUTION 3

- Move the sensor closer to the work area.

The light does not switch on when presence is detected even though the light level is inadequate.

The light does not switch off when presence is detected even though the light level is adequate.

→ Malfunction connected with the lighting regulation.

Solution identical to "The light switches on when presence is detected even though the light level is adequate" (p. 30).

Reminder:
With an ON/OFF luminaire: the external light level must be higher than the light level threshold + a safety coefficient, then wait at least 10 min before switching off.
With a dimmable luminaire: wait for 10 to 15 min to see whether the lighting power has decreased significantly.

Safety coefficient = 0.5 x the light level threshold.
Switch-off level = 1.5 x the light level threshold + artificial light provided.

When the threshold is less than 100 lux, the formula becomes:
Switch-off level = 150 lux + artificial light provided.

APPLICATION EXAMPLES

1) INDIVIDUAL OFFICE



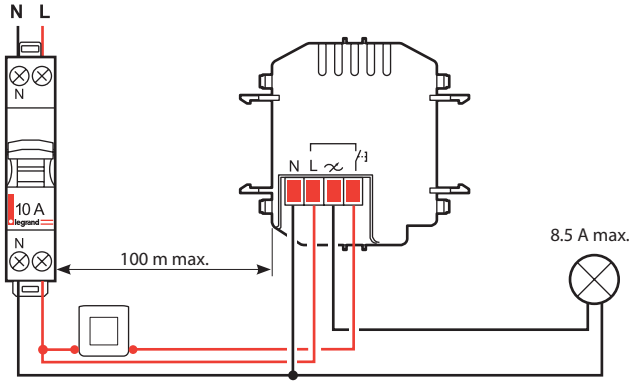
Equipment: 1 PIR&US false ceiling lighting management sensor = 0 488 06
1 Mosaic pushbutton = 0 770 40

Operation: Presence is detected in the room, the light does not switch on. If the light level is inadequate, the person must press the pushbutton to switch on the light.
The sensor starts regulation so that the light will only be switched on when needed.
The lighting can be controlled manually at any time (regulation is switched off). The person leaves the office. The light switches off after the time delay.

Configuration:

• Time delay:	15 minutes
• Sensitivity:	PIR = very high US = high (to be adapted to suit the dimensions of the room)
• Operating mode:	Manual ON/Auto OFF
• Detection system:	Initial = PIR and US Maintain = PIR or US Restart = PIR or US
• Light level threshold:	300 lux
• Regulation:	Activated
• Additional light:	Auto
• Automatic control:	Closed loop

Wiring diagram:



2) CORRIDOR



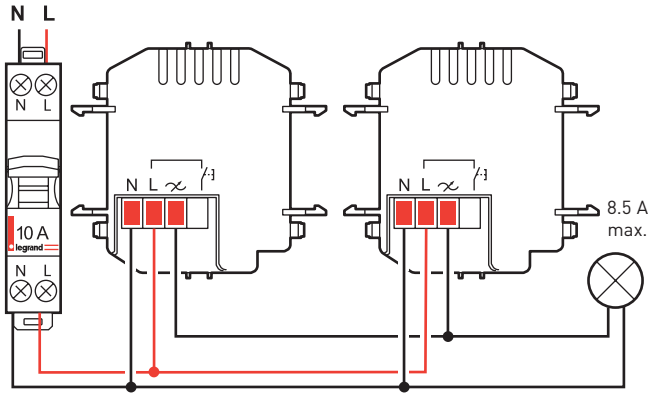
Equipment:
Option 1 (one sensor every 8 m): PIR false ceiling lighting management sensor = 0 488 07
Option 2 (one sensor every 20 m): PIR false ceiling lighting management sensor = 0 488 17

Operation:
Presence is detected in the corridor area, the light switches on if the light level is inadequate. The sensor starts regulation so that the light will only be switched on when needed.
The person leaves the corridor area. The light switches off after the time delay. If the person remains in the area for less than 20 seconds, the time delay is reduced to 3 minutes

Configuration:

• Time delay:	10 minutes
• Sensitivity:	PIR = very high (to be adapted to suit the dimensions of the room)
• Operating mode:	Walk-through
• Detection system:	Initial = PIR Maintain = PIR Restart = deactivated
• Light level threshold:	100 lux
• Regulation:	Activated
• Additional light:	Auto
• Automatic control:	Closed loop

Wiring diagram:



3) MEETING ROOM



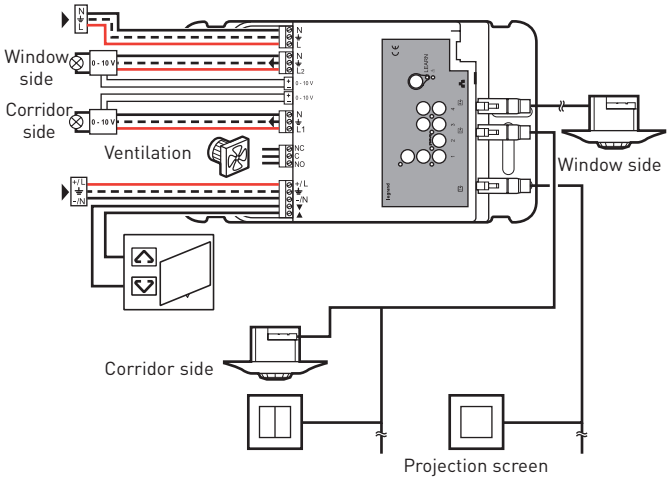
Equipment:
2 PIR&US false ceiling BUS sensors = 0 488 22
1 multi-application false ceiling controller (2 light outputs,
1 ventilation output, 1 projection screen output) = 0 488 47
1 scenario remote control = 0 882 32
1 one-way pushbutton = 0 784 71
1 two-way pushbutton = 0 784 73

Operation:
Presence is detected in the meeting room, the 2 lighting circuits switch on, the ventilation switches to comfort mode and regulation starts.
The lighting is regulated over 2 areas: corridor side/window side.
The scenarios can be activated from the scenario button and/or the remote control.
(Example of a scenario: projection/end of projection/lights on 100%/raise-lower the projection screen, etc.).
The lighting and the screen can be controlled manually at any time (regulation is switched off).
The person leaves the meeting room. The light switches off after the time delay.

Configuration:
After wiring and powering up the installation, an automatic configuration programs the controller and its peripherals. The sensors must now be configured, as follows:

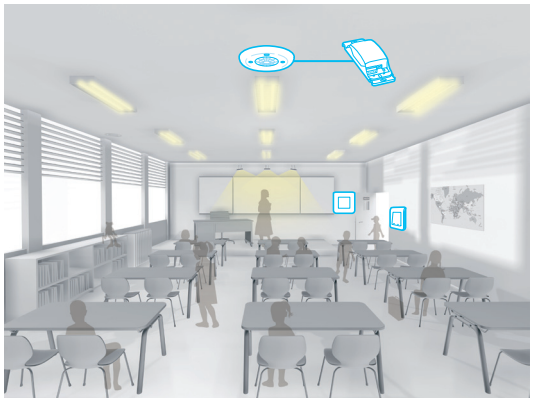
• Time delay:	10 minutes
• Sensitivity:	PIR = very high/US = high (to be adapted to suit the dimensions of the room)
• Operating mode:	Auto ON/Auto OFF
• Detection system:	Initial = PIR and US Maintain = PIR or US Restart = PIR or US
• Light level threshold:	300 lux
• Regulation:	Activated
• Additional light:	Auto
• Automatic control:	Closed loop

Wiring diagram:




0 882 31

4) CLASSROOM



Equipment:
1 PIR&US false ceiling lighting management sensor – 0 488 22
2 Mosaic pushbuttons – 0 770 30 (room lighting)
1 Mosaic pushbutton – 0 770 11 (board lighting)
1 analogue controller for DALI luminaires – 0 488 51

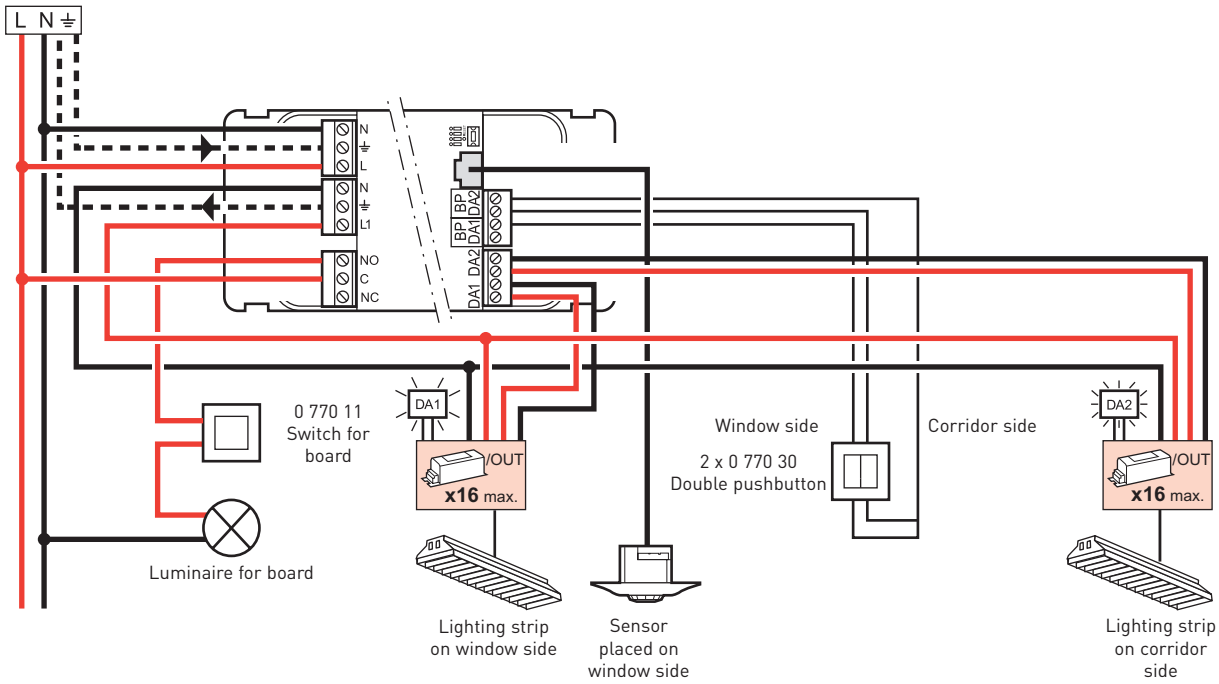
Operation:
The person enters the room, the light does not switch on.
If the light level is inadequate, the person must press the pushbutton to switch on the light.
The two lighting channels switch on with a 30% difference between the window side channel and the corridor side channel.
The sensor starts regulation so that the light will only be switched on when needed.
The lighting can be controlled manually at any time (regulation is switched off).
A switch is used to switch the board light on/off.
The person leaves the classroom. After the time delay, the room and board lights switch off.

Status memory: if the board light was switched on before the general switch-off, when someone returns to the room the board light will be switched back on.

Configuration:

• Time delay:	15 minutes
• Sensitivity:	PIR = very high/US = high (to be adapted to suit the dimensions of the room)
• Operating mode:	Manual ON/Auto OFF
• Detection system:	Initial = PIR and US Maintain = PIR or US Restart = PIR or US
• Light level threshold:	300 lux
• Regulation:	Activated
• Additional light:	Auto
• Automatic control:	Closed loop

Wiring diagram:



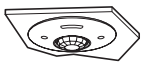
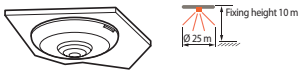
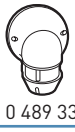
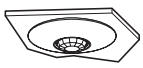
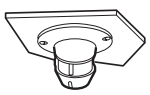
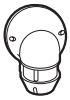
RANGE OF SENSORS

LIST OF LIGHTING MANAGEMENT SENSORS

AREAS WITH NATURAL LIGHT

Automatic switch-on/switch-off, RT 2012 compliant, check presence and light level continuously

RT 2012

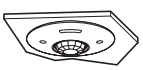
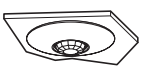
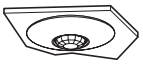
WORKPLACES			
Individual office, classroom, meeting room, open-plan office space	  0 488 06[1]/09	  0 489 16[2]	  0 784 52 0 784 53[1]
PASSAGEWAYS			
Hall, stairs, etc.	  0 488 07[1] 0 488 08[1]	  0 489 17[2]	  0 784 54[1] 0 784 55[3] - 2-wire
Corridor	 0 488 17[1]	  0 489 17[2]	  0 784 54[1] 0 784 55[3] - 2-wire
High ceiling area (gymnasium, storage area, etc.)	 0 489 32 (surface mounted)	  0 489 33	-
Toilets, bathroom, cloakrooms, small storage area	  0 488 04[2]	  0 489 16[2]	  0 784 54[1] 0 784 55[3] - 2-wire
IP 55 OUTDOORS AND DAMP AREAS			
Outdoor car park, cellar, test room, laboratory	  0 489 32 (surface mounted)   0 489 33 directional head	  0 489 33 directional head	-

1: Can be surface mounted using an accessory, to be ordered separately - 2: 1 lighting output + 1 ventilation output - 3: Version for refurbishment installations

LIST OF SENSORS AND CONTROLLERS FOR MANAGING SEVERAL CIRCUITS

CHOICE OF SENSOR...

Automatic switch-on/switch-off, RT 2012 compliant, check presence and light level continuously — RT 2012

	INSTALLATION		
	Ceiling	Wall mounted	
		Surface mounted	Flush mounted
WORKPLACES			
Individual office, classroom	 0 488 22 	 0 488 23 	 0 784 86 
PASSAGEWAYS			
Small storage area, toilets, cloakroom, etc.	 0 488 20 	 0 488 24 	 0 784 85 
Long areas (corridor, etc.)	 0 488 20 	 0 488 25 	-
High ceiling areas (gymnasium, storage area, etc.)	-	 0 488 25 	-
OUTDOORS AND DAMP AREAS			
Equipment room, outdoor car park, cellar, test room, laboratory, cloakrooms	-	 0 488 30 	-

... AND CIRCUITS TO BE CONTROLLED

	ON-OFF	DIMMING		
		DALI	1-10 V	Halogen - Incandescent - Dimmable LED[1]
1 lighting circuit in 1 room	0 488 50	0 488 51	0 488 52	0 488 45
1 lighting circuit + HVAC circuit in 1 room	0 488 50	0 488 51	0 488 52	-
2 lighting circuits in 1 room	0 488 50	0 488 51	0 488 52	0 488 45
2 lighting circuits + HVAC circuit in 1 room	-	0 488 51	-	-
2 lighting circuits (2 inputs, 2 outputs) **in 2 rooms**	0 488 41	-	0 488 42 (1000 VA)	0 488 45
4 lighting circuits (4 inputs, 4 outputs) **in 4 rooms**	0 488 43	0 488 44 (max. 32 ballasts)	0 488 43	-
2 lighting circuits + 1 shutter circuit + 1 HVAC circuit (4 inputs, 4 outputs) **in 1 room**	0 488 47	-	0 488 47	-

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

KEY TO PICTOGRAMS


PIR technology


US technology

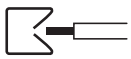

PIR/US technology


Manual ON/Auto OFF mode

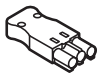

Walk-through mode


Auto ON/Auto OFF mode


Detection technology


Capacity of the automatic terminals


Capacity of the screw terminals


Capacity of the fast connection plug

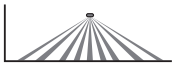

Light level


Time delay


Sensitivity


Factory-set light level

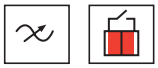

Factory-set time delay

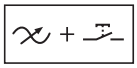

Detection area


Operating temperature


Light load


Frequency


Phase cut


Volt-free contact output


Measurement of light level


Recharge battery


Time


Parameter setting



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