

# THORN

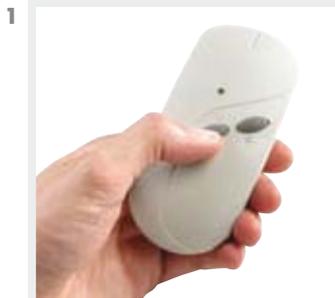
## SensaLink

Indoor Lighting Controls for interactive lighting in applications, requiring higher levels of comfort

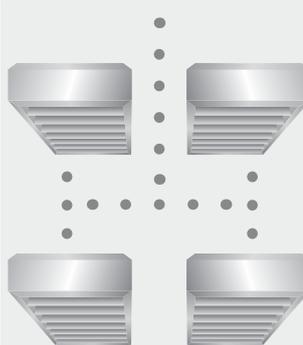


# Introduction

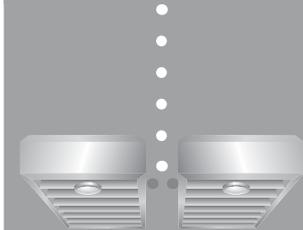
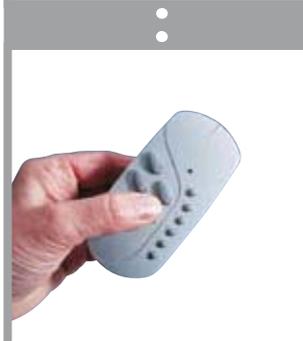
Thorn's Indoor Lighting Controls offer consists of three portfolios



**1 Sensalite** features Thorn luminaires with built-in sensors, and remote sensors, offering stand-alone presence detection, daylight linking and infra-red control. Sensalite is the first step to comfort and energy saving, and is used for small office applications, simple classrooms, corridors etc.

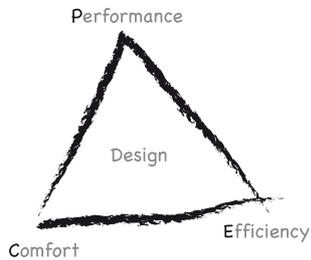


**2 ControlLiteDIM** is used for mid-sized projects (1 room): The modular system creates scene setting, enabling daylight linking and integrating presence detection. It is easy to commission by the contractor: When wiring the system, the luminaires are allocated to the switches, scene plates and presence detectors.



**3 SensaLink** features Thorn luminaires with built-in sensors and remote sensors offering presence detection, daylight linking and infra-red control, scene setting and the possibility to link sensors. It provides an interacting lighting management system for projects requiring greater levels of comfort.





### How does SensaLink support the Thorn PEC strategy?

**Performance:**  
SensaLink sets the right light level, at the right place and at the right time.

**Efficiency:**  
SensaLink is a perfect tool to provide an efficient light. It enables you to dim the luminaires, link the luminaires to presence and link them to the incoming daylight to achieve energy saving. Therefore light is only provided when you need it and in the quantity that you require. SensaLink also continually adjusts its light output and energy input. This maintains illuminance over the entire period, saving the energy that conventional systems waste while fulfilling the objectives of many international and local lighting standards.

**Comfort:**  
Manual dimming and presence detection are features of SensaLink that provide a comfortable lighting solution to the user. SensaLink is very easy to install and set up. By maintaining the illuminance level over the entire period, you will always have the same light level that you require. Therefore the lighting remains comfortable all of the time, without the need for regular and inconvenient re-adjustments. Additionally you can link several zones or rooms within an application that interact with one another.

### Where is SensaLink used?

- The typical applications for SensaLink are:
- Either, one-room, multi-function applications requiring the added comfort of scene setting, screen and blackout blind control, e.g. lecture theatres or conference rooms that divide into smaller and individually controlled areas.
  - Or, larger-sized buildings with several floors, requiring individual daylight and presence linked zones within each floor, e.g. open space offices, with the possibility to link the luminaires within these zones and adjacent areas.

Features	Applications			
	Offices	Conference rooms	Lecture theatres	Class rooms
Dimming and Switching	•	•	•	•
Presence-link	•	•	•	•
Daylight-link	•	•		•
Luminaires interacting with adjacent areas	•	•	•	•
Distributed intelligence	•	•	•	•
Scene setting		•	•	
Partition management		•		
Motorised Screen control		•	•	•
Motorised Blackout blind control		•	•	

# Overview of functions and their benefits

## Response to presence/absence

SensalLink sensor heads provide presence linking that will detect you entering and leaving the room, switching the lighting On, to a pre-programmed level, and switching or fading to Off after an adjustable Off time delay of 5 to 60mins. Additionally, the system offers a 'semi-automatic' mode (absence detection), where you can switch On the lighting manually (via a switch, a hand held controller or a scene plate), and the detector will switch or fade the lighting to Off automatically after you have left the room. Both cases give the possibility to dim the light to a minimum or a defined level instead of switching it Off.

## Dimming response to incoming daylight

SensalLink detectors provide a dimming facility that automatically adjusts the light level in response to the available daylight. You decide which light level the controlling sensor should maintain through the day, and if the sensor should switch the lighting Off when there is enough daylight.

## Switching response to incoming daylight

Here, dedicated SensalLink heads, with relay output, switch fixed output luminaires, On or Off, in response to changes in the ambient light level. These products come with an adjustable light level.

## Local override

- SensalLink offers you an infra-red hand held controller to override sensors that are responding to the incoming daylight – very convenient, especially in larger office applications, where you want to change the lighting allocated to one desk only, or to a group of luminaires. It also allows recalling and setting six scenes for different tasks.
- Alternatively, you can use either the SensalLink two button control plate or a momentary action switch for changing the light level and to switch the light On and Off. Both mounted onto the wall next to the room entry, and therefore ideal for smaller sized areas.
- The wall mounted SensalLink scene plate is a versatile interface for overriding the light within conference rooms or lecture theatres, allowing you to set and recall six scenes for the different activities (see 'Scene setting').



You are present. Insufficient daylight. Lights on.



No-one present. Lights off.



You remain present. Sufficient daylight. Lights dim.



You enter the room. Lights switch on.



You remain present. Bright daylight. Lights dimmed to minimum.

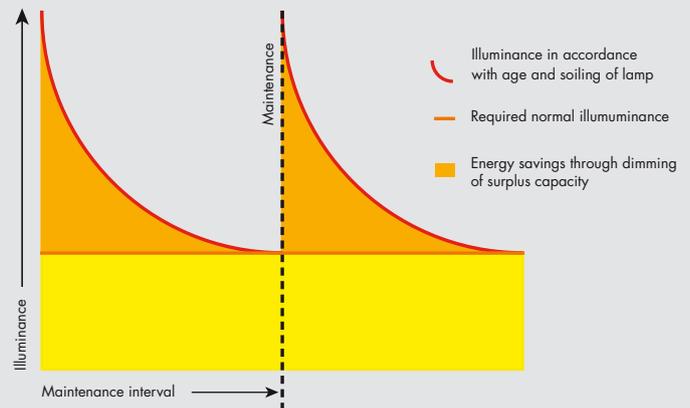


### Parameter setting for tailor-made functionality

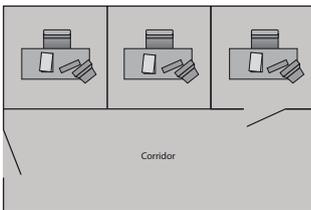
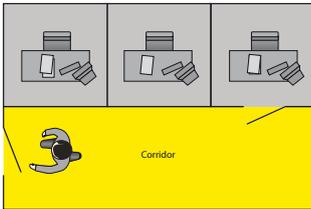
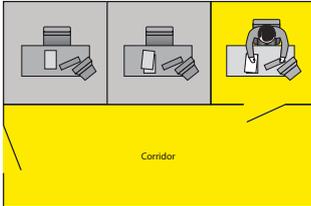
This portfolio uses an infrared programming tool to re-programme a wide range of parameters, and to set the regulating light level. This is particularly useful in that you are able to change the parameters without touching the installation, and is therefore fast, hassle-free and doesn't disrupt the room users: The programming is done remotely and hence can be operated from the ground.

### Maintained illuminance level

Light levels reduce over time due to lamp age and dirty optics. Conventional installations provide more light than is necessary to ensure that the right level is reached when depreciation is worst. This results in energy wastage and unnecessary cost. Being intelligent, the SensaLink detectors continually adjust the light output and energy input. This maintains illuminance over the entire period, saving the energy that conventional systems waste and fulfilling the objectives of many international and local lighting standards.



# Overview of functions and their benefits



## Interaction between luminaires

SensaLink allows sensors to be linked. In this way, sensors “listen” to each other and share information about presence/absence within their detection zones. This feature is useful for example in office applications; notional corridors, staircases, and lobbies can be set to remain lit as long as one of the sensors is detecting a presence, providing enough light in the surrounding areas and giving a feeling of safety (also known as ‘corridor hold’ function).

## Interaction with room partitions

Some applications require larger rooms to be divided into smaller separate rooms, depending on the activities. SensaLink detects if the rooms are separated or linked, and reacts accordingly: If the partition is closed, SensaLink provides individual control within each room. If the partition is opened, the combined rooms offer joined control.



## Reliability with decentralised functions

SensaLink keeps local functions local. All parameters and settings for a specific sensor head are stored within the unit, therefore it will continue to function even if the Bus system it is connected to fails or is interrupted. The benefit is that presence and daylight-link, and local override functions are continuously provided, without the room user realising the loss of the Bus system.

## Upgrade ability

As the SensaLink sensor heads are able to work “stand-alone” when they are not connected to a central Bus system (see also ‘Reliability with decentralised functions’), the possibility arises to install them first, and to link them, via the SensaLink Bus, in a second phase. By doing this, the functionality of the installation would initially be similar to several Thorn SensaDigital installations, working independently from one another, and then in the second stage provide all the additional SensaLink functions. In existing SensaLink installations the Bus system also allows you to add additional devices and to extend the system at anytime. This provides you with the flexibility that you would expect from a control system, adapting to the continuously changing needs, uses and room layouts within a building.

### Blackout blind and screen control

Especially for conference rooms and lecture theatres you expect blackout blinds and screens to be integrated within the different scenes. SensaLink provides this comfort

### Scene Setting

For every activity or room use you can set up to six different scenes (plus Off), controlling light levels, with or without blackout blinds or projection screens. This provides the comfort you expect for a lecture theatre, a conference room and other applications that are used in various ways. Typically Scene 1 is the daylight-linked one.



#### Scene 'Presentation'

- Lighting linked to presence and daylight
- Accent light onto flip chart
- Opened Blackout Blinds



#### Scene 'Lecture'

- Lighting dimmed to adapt to digitally projected picture, but still giving enough light for auditorium to take notes
- Closed Blackout Blinds
- Lowered projection screen
- Accent light onto lecturer's podium



#### Scene 'Break'

- Lighting on full to reactivate auditorium
- Opened Blackout Blinds



# System topology and components

## 1) Starting with a multi sensor head for each group of luminaires within an area...

Sensalink responds to presence/absence by switching, and to daylight by dimming. Entering an area causes the lighting to come to a pre-programmed level and the luminaires automatically adjust depending on the natural light present.

**a)** Thorn was among the first companies to offer intelligent luminaires:

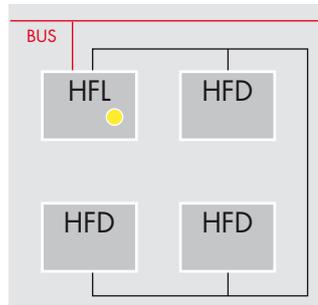
- The Sensalink Luminaires incorporate a miniature sensor capable of controlling electronic gears, transformers and phase dimmers via a DSI signal.
- The benefit of a Sensalink Luminaire lies in the fact that it works as soon as you take it out of the box and install it to the ceiling. You can still switch the luminaire Off via a standard mains switch, which also means you do not have to change an existing installation.
- 'Master-slave' arrangements are possible as well, where you connect further luminaires ('slaves') to the DSI output of the Sensalink Luminaire ('master'). The maximum number of ballasts incorporated in all controlled luminaires must not exceed 4, and all luminaires should be in the detection zone of the MiniSensalink head (diameter 5m at nominal mounting height 2m above work plane, maximum mounting height 3m).

Note: See relevant luminaire Ordering Guides for Thorn Sensalink luminaires (containing 'HFL' in their descriptions). 'Slave' luminaires for connection to the Sensalink Luminaires are the standard DSI dimmable ones (containing 'HFD' in their descriptions).

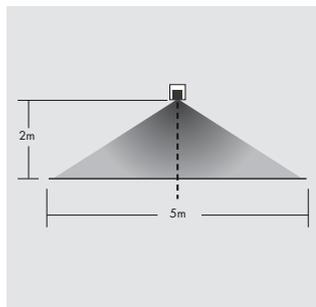
Please refer to 'Product parameters' for possible sensor settings.



MenloSoft SR with built-in MiniSensalink head



Optional 'Master-slave' luminaire arrangement (max. 4 DSI ballasts in total)



Detection pattern

**b)** Remote Sensalink sensor heads enable you to control a group of luminaires: instead of having a 'master-slave' arrangement as described in a). These remote sensor heads are mounted to the ceiling and control a luminaire group incorporating up to 8 DSI ballasts each. These luminaires should be in the detection zone of the sensor head (diameter 6m at nominal mounting height 2.4m above work plane, maximum mounting height 3m). You have the choice between a recessed mounted version that is suitable for unobtrusive installation in suspended ceilings ref. SENSALINK MRE SENLDDSI, or a surface mounted version for all other types of ceilings ref. SENSALINK MSF SENLDDSI.

The sensor incorporates a DSI output that is connected to the DSI dimmable luminaires via a 2-pole polarity-free lead. The maximum length of the DSI lead between sensor heads and luminaires can be 12m, using standard mains wiring 2 x 1.5mm<sup>2</sup> with solid or stranded conductors, e.g. H05VV-U (harmonised standard 300/500V cable, PVC insulated and sheathed, with solid conductors).

Note: All standard Thorn DSI dimmable luminaires can be controlled via remote Sensalink heads: look for Thorn luminaires containing 'HFD' in the Ordering Guide descriptions.

Instead of controlling dimmable luminaires, there is also a recessed remote sensor head for switching fixed output luminaires, for a maximum load of 6A, considering inrush currents ref. SENSALINK MRE SENLDSW.

This sensor is connected to the luminaires with standard mains wiring.

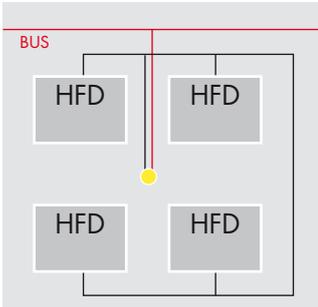
Please refer to 'Product parameters' for possible sensor settings.



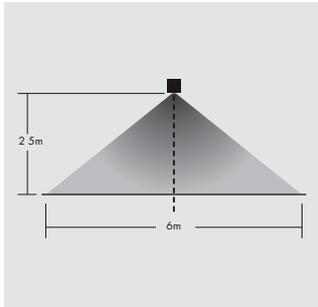
Recessed remote SensaLink head



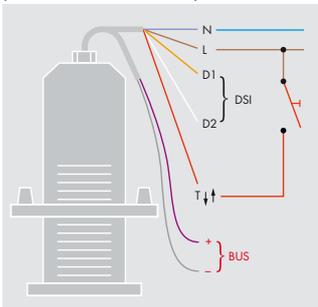
Surface mounted remote SensaLink head



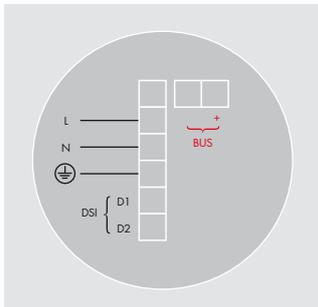
Sensor connected to luminaire group  
(max. 8 DSI ballasts in total)



Detection pattern



Wiring recessed version



Wiring surface mounted version

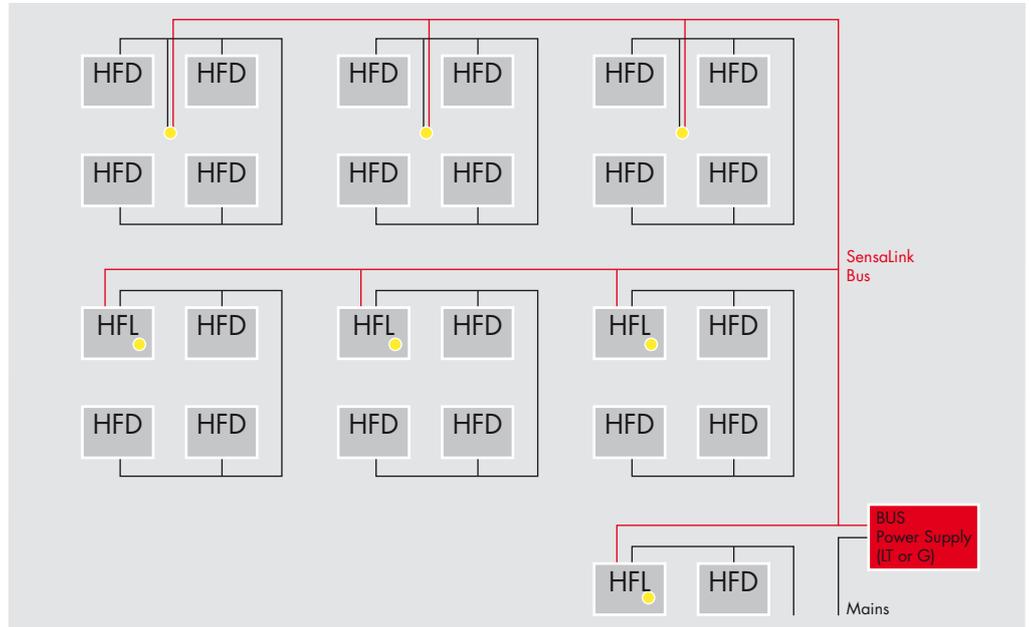
# System topology and components

## 2) ...linking these areas within rooms and floors...

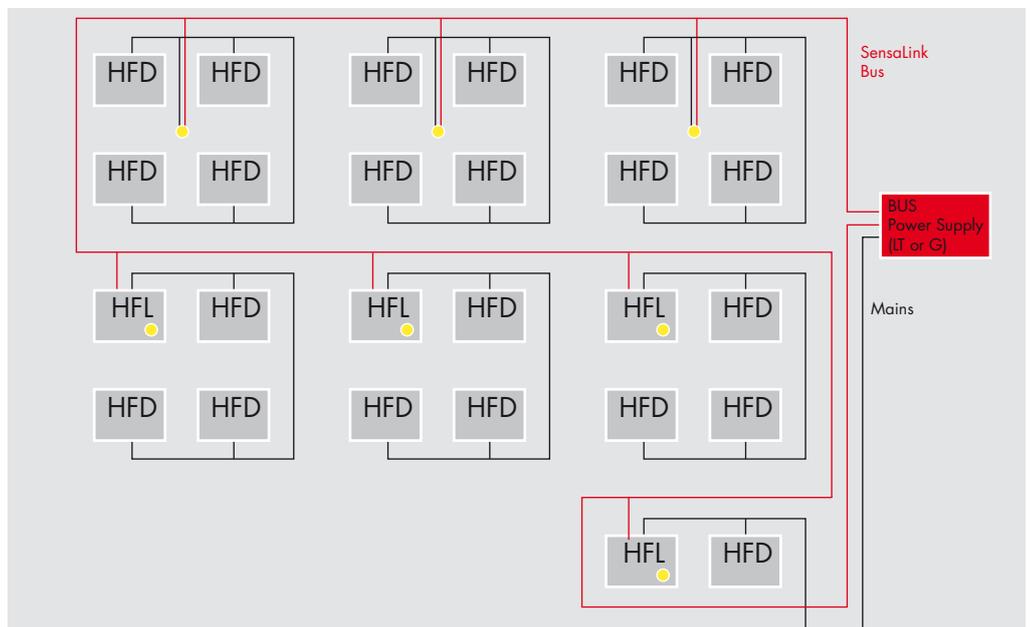
Within an application several of these individually controlled areas can now be linked via the SensaLink Bus. To accomplish this technically, a two-wire Bus (mains rated and unscreened twisted pair) runs from device to device, and a Bus power supply enables the devices to communicate with each other and share occupancy information. SensaLink provides a standard Bus power supply for up to 100 devices ref. SENSALINK SENLPS LT, and a larger unit for up to 200 SensaLink devices ref. SENSALINK SENLPS G.

The Bus wiring topology can be a ring with short spurs, radial or star like. The Bus lead may also run alongside mains wiring, provided that the Bus is suitably insulated. The mains topology is independent from the Bus topology, as the SensaLink devices can be mains powered from different electrical circuits and phases.

For interconnecting all SensaLink items a bus lead is used: The maximum length of this SensaLink Bus can be up to 1500m (if wired as a ring), the cable should be 1.5mm<sup>2</sup> twisted-pair unscreened.



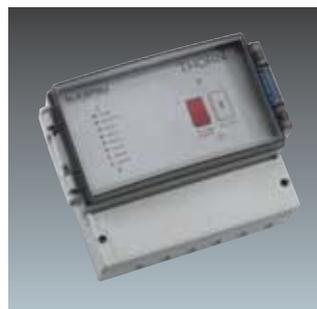
Example for radial bus topology; maximum length of each radial 500m (300m) with 1.5mm<sup>2</sup> (1.0mm<sup>2</sup>) conductor size



Example for ring bus topology; maximum length of ring 1500m (800m) with 1.5mm<sup>2</sup> (1.0mm<sup>2</sup>) conductor size



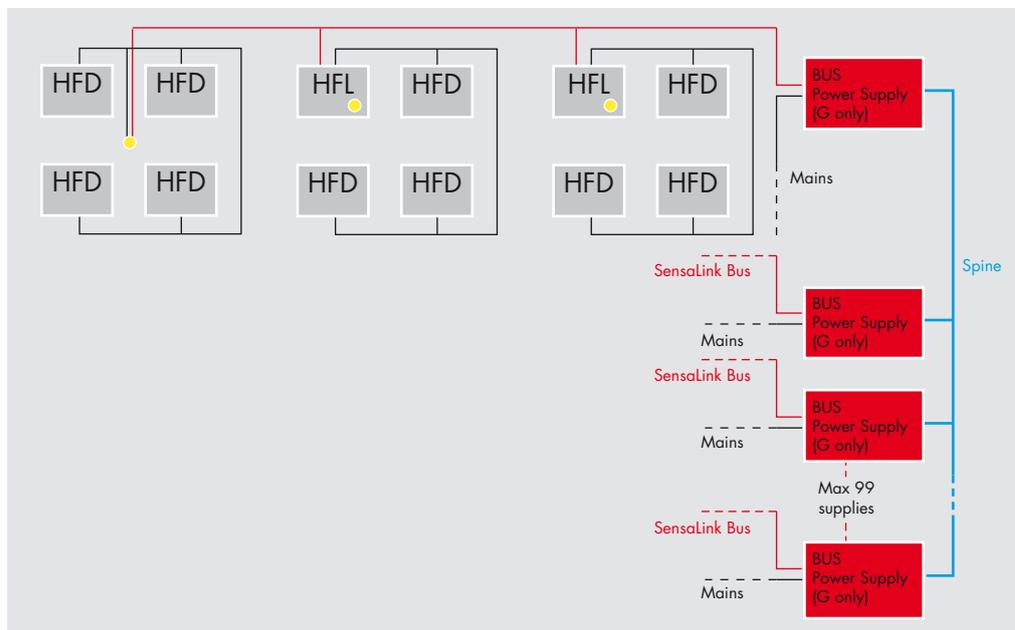
Standard Bus power supply



Bus power supply for larger applications

### 3) ...and connect these floors to a building backbone

In larger applications requiring several of the larger Bus power supply units ref. SENSALINK SENLPS G, you can link up to 99 of these Bus power supplies to a common spine or backbone (2 x 2 x 0.2mm<sup>2</sup>, twisted pair, screened communication cable, e.g. a RS-232 computer cable, maximum length 1200m). So with SensaLink large buildings can be catered for!



# System topology and components

## 4) User interfaces

Though a properly commissioned system will provide the right light for most of the time, occasionally you require more or less light. SensaLink offers you the accurate user interfaces for the different applications.



*Infra-red Hand held Controller*

An Infra-red Hand held Controller enables you to dim and brighten, and to switch On and Off the lighting: You have the choice between changing the light level locally and changing the light level of the group(s) your luminaires are allocated to. This Infra-red Hand held Controller is ideal for meeting rooms and other applications that are used in different ways, as it provides the facility to set and to recall 6 scenes for the different activities ref. SENSALINK SENLRC.



*Scene Select Plate, polished chrome finish*

For lecture theatres, conference rooms and other applications with the main focus on scene setting, SensaLink's wall-mounted Scene Select Plate is the appropriate interface. It provides buttons for On and Off, for 6 scenes and for dimming and brightening. All buttons endow with indication LEDs, showing you the current setting at any time. To match the Scene Select Plate to different wall materials and colours, it is available in polished brass, polished chrome, brushed stainless steel and white finish, ref. SENSALINK SENLSS V2 with BR POL, CHR POL, RS BS and WHI COVER.



*Local Control Plate*

The Local Control Plate allows you to switch On and Off, and to dim and brighten a group of luminaires, ref. SENSALINK WHI MWA SENLCP.

## 5) Commissioning Tool

## 6) DSI and switching outputs, blind and screen control, switch inputs and interface to other systems



Digital Programmer

Thorn commissioning engineers set up SensaLink installations; this service is offered together with the luminaires and the SensaLink items. There is also the possibility to train contractors and facility managers on site, looking after the project later as well. Whoever commissions, reconfigures or changes SensaLink installations, uses the SensaLink Programmer ref. SENSALINK SENLP to address sensor heads, to group them, to allocate control units to the groups and to define all the interactions between the SensaLink devices. It is also used to configure the parameters of the sensor heads, e.g. illuminance levels, Off delay time and many others. Additionally it can be used to copy data from one head and to use it for other ones. This device features a large LCD screen to make it easy to use. And due to communicating via infra-red with all the SensaLink devices, the commissioning can happen locally and from the ground: This makes the work easy and safe, and does not disrupt any room users during reconfigurations.



Universal Bus Transceiver

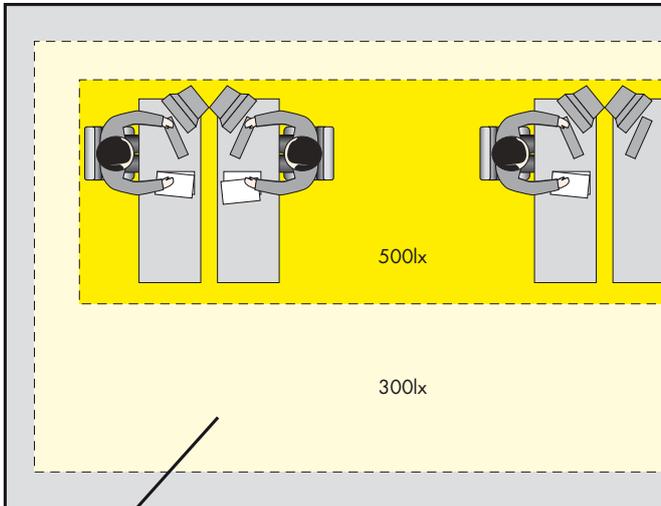
The SensaLink Universal Bus Transceiver ref. SENSALINK SENLT is multi-functional and provides several features:

- With its DSI output, it is able to control dimmable luminaires incorporating up to 20 DSI ballasts, e.g. in an area where luminaires do not need to be linked to presence or daylight.
- Providing a switching relay output (maximum 10A), it enables fixed output luminaires (with magnetic or electronic gears) and non-lighting loads, e.g. screens and blackout blind motors, to be brought into the SensaLink installation.
- The Universal Bus Transceiver also allows external devices to provide switch inputs into the system, e.g. from an external switch, timer, fire alarm system or BMS, and can be configured to recall a specific scene, or to switch On or Off.
- All SensaLink sensors can be allocated to Global Groups: This grouping structure is of less consideration to building users, but is of great importance for facility management, as it enables central and external systems to override all sensor heads allocated to a Global Group. The SensaLink Transceiver is used as the interface to these central systems: These could be central switches, or switching Building Management Systems (BMS) or timers. Global Group addressing is typically used for load shedding, security, night and other functions.

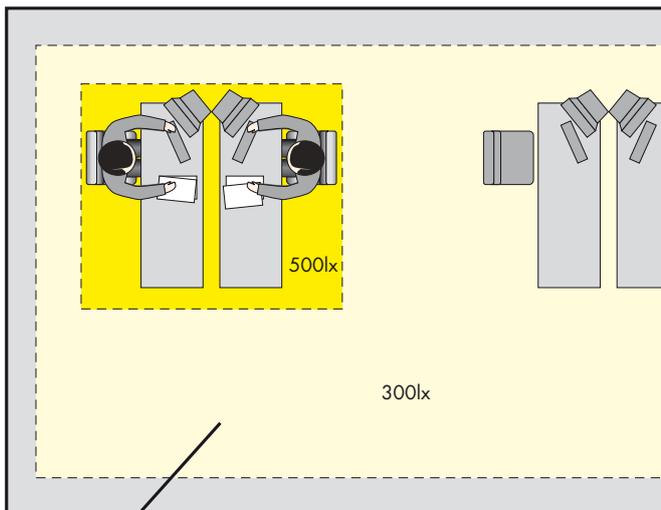
Sensor heads and SensaLink Transceiver inputs may be allocated to one of two possible Global Groups, or to both if required.

- The Transceiver's input feature is used for room partitions as well, the system now knows if the rooms are separated or linked, and reacts accordingly: If the partition is closed, SensaLink provides individual control within each room. If the partition is opened, the combined rooms offer joined control.

# Support of building compliance with European standards



Office example, fully and partly occupied



## SensaLink supports your project to comply with EN 12464

The recently introduced European Norm 12464 differs from the classical approach in which the lighting design objective was to achieve average illuminance throughout the room. Next to many other criteria, the new standard on the one hand allows lighting designers greater freedom and designs that are more in line with the needs of individuals, and on the other defines that lighting must be delivered in the location where people perform their visual tasks. Different maintained illuminance levels apply for the different work places, and the surrounding areas where visual tasks are performed less often. For example for a 500lx task illuminance the immediate surround illuminance can drop down to 300lx. SensaLink maintains the specified illuminance levels, and also checks for you which areas are actually needed and occupied, and adapts the light output for the unoccupied, but surrounding areas, according to the standard.

## SensaLink supports your project to comply with EN 15193

This standard establishes conventions and procedures for the estimation of energy requirements of lighting in buildings. It also provides guidance on the establishment of notional limits for lighting energy derived from reference schemes and gives advice on techniques for separate metering of the energy used for lighting that will give regular feedback on the effectiveness of lighting controls. Annex D (that is informative) recommends that (depending on the application) an area within one room, if it is illuminated by a luminaire or by a group of luminaires (manually or automatically) switched together, should not be larger than 30m<sup>2</sup>. In addition, in the case of systems with automatic presence and/or absence detection the area covered by the detector should closely correspond to the area illuminated by the luminaires that are controlled by that detector. As lighting controls system based on a network of multi sensor heads, SensaLink is the ideal tool to realise the recommended way of linking luminaires to daylight and presence/absence for each area within a room, and therefore will support good energy ratings for your building.

# Product parameters

To adapt SensaLink to the local requirements, several parameters can be set within each multi sensor head or SensaLink luminaire. These are selected during commissioning, and can be easily copied from one head to the other to keep the commissioning time as short as possible.

## Power-up Condition

When mains power is first applied, sensor heads either switch the luminaires On immediately (Power-up On) or hold the lighting load Off for up to 30s before looking for occupancy (Power-up Off). Power-up On is mainly used for corridors and access routes, while setting Power-up Off for other areas reduces the start-up load following any interruption in supply.

## Operation Mode

Set for automatic operation, the sensor head switches the luminaire On and Off automatically. In semi-automatic mode (also called “absence mode”), luminaires remain switched Off when detecting occupancy, but are switched On either via an user interface (e.g. the Infra-red hand held Controller) or when another head, part of the same zone, is switched On and shares this info.

## Start Lamps

When detecting presence, lamps can be switched On to either maximum or minimum level, before ramping to the level the daylight-link calculates, or the level set one for a recalled scene.

## When Vacant

Once the ‘Off Delay’ (see above) has elapsed, lighting can either be set to...

## Entry Scene

Any one of the 6 available scenes can be chosen to be activated when presence is detected. As scene 1 is the daylight-linked scene, this is the default Entry Scene.

## Dimming Range

The daylight-link provided by a SensaLink sensor head will regulate over the full dimming range of the ballast’s capacity (typically between 100 and 1%), to save as much energy as possible. In certain instances a minimum light level can be set, avoiding the light level going below a certain percentage.

## Set Light Level

The luminaires are brightened or dimmed until the desired illuminance level is achieved. This level is stored using the SensaLink Programmer. For luminaires with dimming ballasts, any lighting level within the operating range of the luminaire may be set. The system automatically compensates for lamp deterioration and luminaire condition, and continually adjusts its light output and energy input. This maintains illuminance over the entire period, saving the energy that conventional systems waste and fulfilling the objectives of many international and local lighting standards.

## Bright-out

Lights can be programmed to switch Off in very bright ambient conditions, and to save even more energy. If Bright-out is not selected, the luminaire will simply remain at minimum light output until occupancy ceases or the daylight contribution decreases.

## Off Delay

This is the time between the last detected occupancy, and when the lighting automatically is changed to the chosen ‘When Vacant’ setting (see below). Off Delay options are 5 to 60min (in 5min steps), several hours, and 10s for test purposes during commissioning.

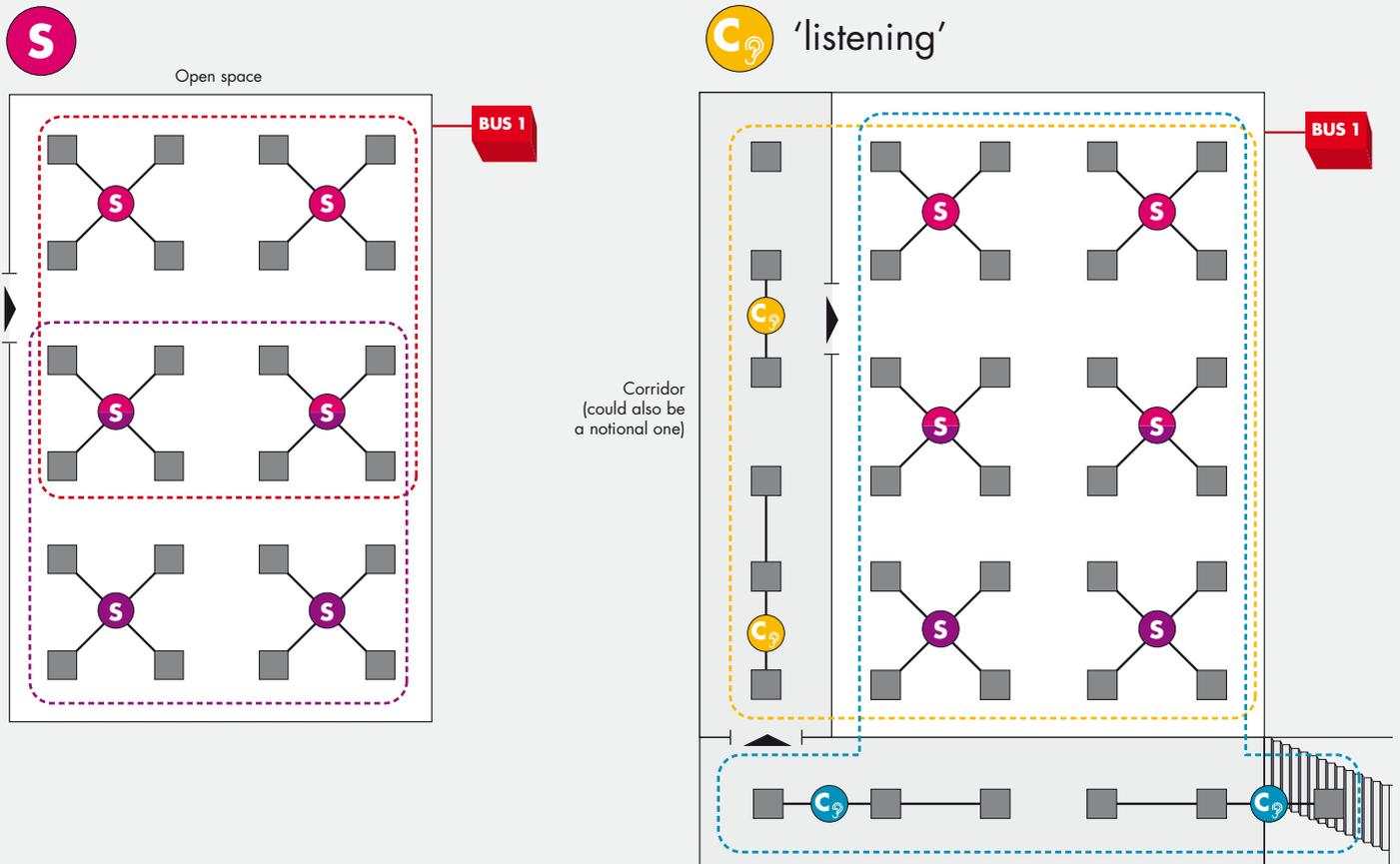
## Fade to Off

If Fade to Off is selected then luminaires dim very slowly (the fade rate is 4min/100%) before switching Off. Fade to Off is recommended in open-plan office areas where instant Off could cause distraction.

Other products next to the multi sensor heads, provide some further parameters, which are detailed in the datasheets. Following the installation of SensaLink, the commissioning of the system and the setting of its parameters is carried out locally using the hand-held infra-red SensaLink Programmer. Settings can be checked at any time. And if the requirements for lighting change, the parameters set during commissioning can be reconfigured quickly and easily.

...switch off...	•		
...go to minimum output...	•	•	•
...continue with daylight-link, but with maximum 25% output...	•	•	•
...go to scene 6 (and therefore to a specified output)...	•	•	•
	...until next occupancy	...for 3 hours and then switch off	...and switch off after the whole building is vacant

# Interactive lighting



## Sensor Group

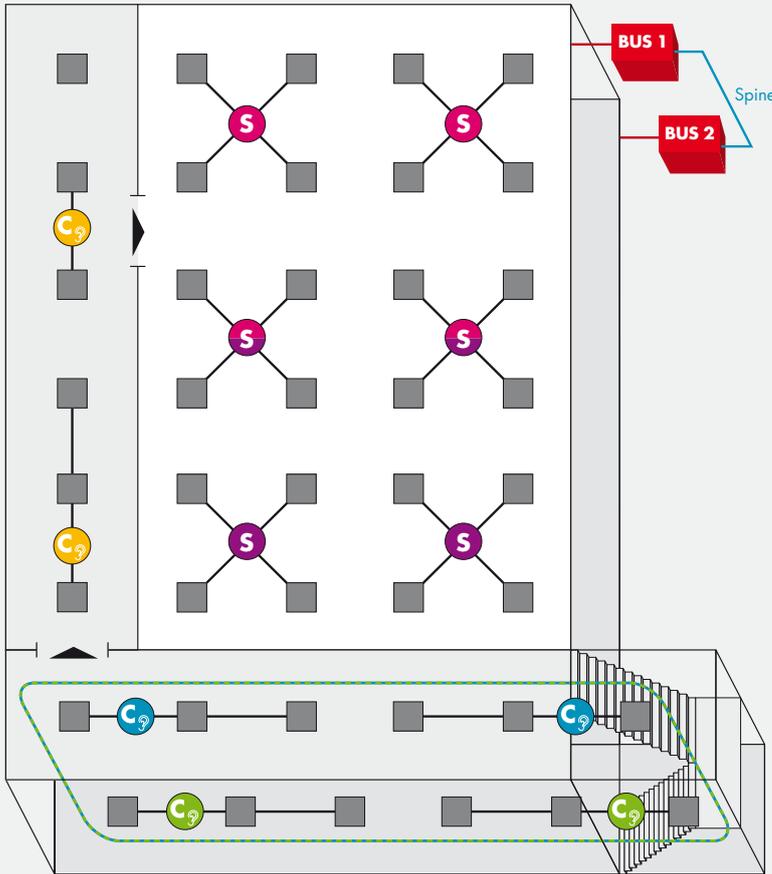
Within a room or space, sensor heads can be allocated to Sensor Groups:

- All luminaires connected to the sensor heads, belonging to a specific Sensor Group, are thus activated as soon as one of the sensor heads detects presence.
- They are deactivated as soon as the last sensor head within the Sensor Group reports vacancy. (And, after the 'Off Delay', go to the 'When Vacant' setting).
- The Sensor Group is also manually overridden via the group buttons of the Infra-red Handheld Controller or any other user interface allocated to this Sensor Group as well.
- Examples for Sensor Groups are areas of teams working within an open space office, or an auditorium area within a larger lecture theatre, sharing occupancy info and manual overrides.
- Possible Sensor Group numbers are 01 to 50.
- One sensor head can be allocated to up to 4 different Sensor Groups: This feature enables to create overlapping areas if required.

## Common Group = Listening Sensor Group

Sensor heads can alternatively be allocated to so-called Common Groups:

- These are similar to the Sensor Groups, but additionally listen to all other sensor heads within a SensaLink installation supplied by the same SensaLink Bus Power Supply.
- That means that all sensor heads allocated to a Common Group instead of a Sensor Group, will delay deactivating until there is vacancy in all areas.
- They are typically used for access routes, reception areas, corridors and notional corridors within open spaces, e.g. as shown in the picture: The light in a corridor will stay On as long as one of the Sensor Groups within the open space detects presence.
- As soon as the open space is vacated, and the Common Group itself also detects absence, the sensor heads within the Common Group will go to their 'When Vacant' setting after the 'Off Delay'.
- Possible Common Group numbers are 1 to 4 (to Common Group 1 see also Building Group).
- Common Groups may overlap if required, as one sensor head can be allocated to up to 4 different Common Groups.
- **Sensor heads are allocated either to a (standard) Sensor Group, or to a (listening) Common Group.**



Main corridors on different levels with staircase

-  Luminaire connected to sensor
- Sensor allocated to:
  -  Sensor Group 1
  -  Sensor Group 2
  -  Sensor Group 1 and 2
  -  Common/Building Group 1
  -  Common Group 2
  -  Common/Building Group 1 (in another bus district)
-  Bus power supply (Global one if linked via spine)
-  Listening

### Building Group = Common Group 1

The Common Group number 1 is a special one:

- If several bus districts within a building, all supplied by different Global Bus Power Supplies, are linked to a common spine, then this Common Group is shared within all bus districts building wide.
- Typically used for staircases and building entrance lobbies.

# Application: lecture theatre

## Specification example:

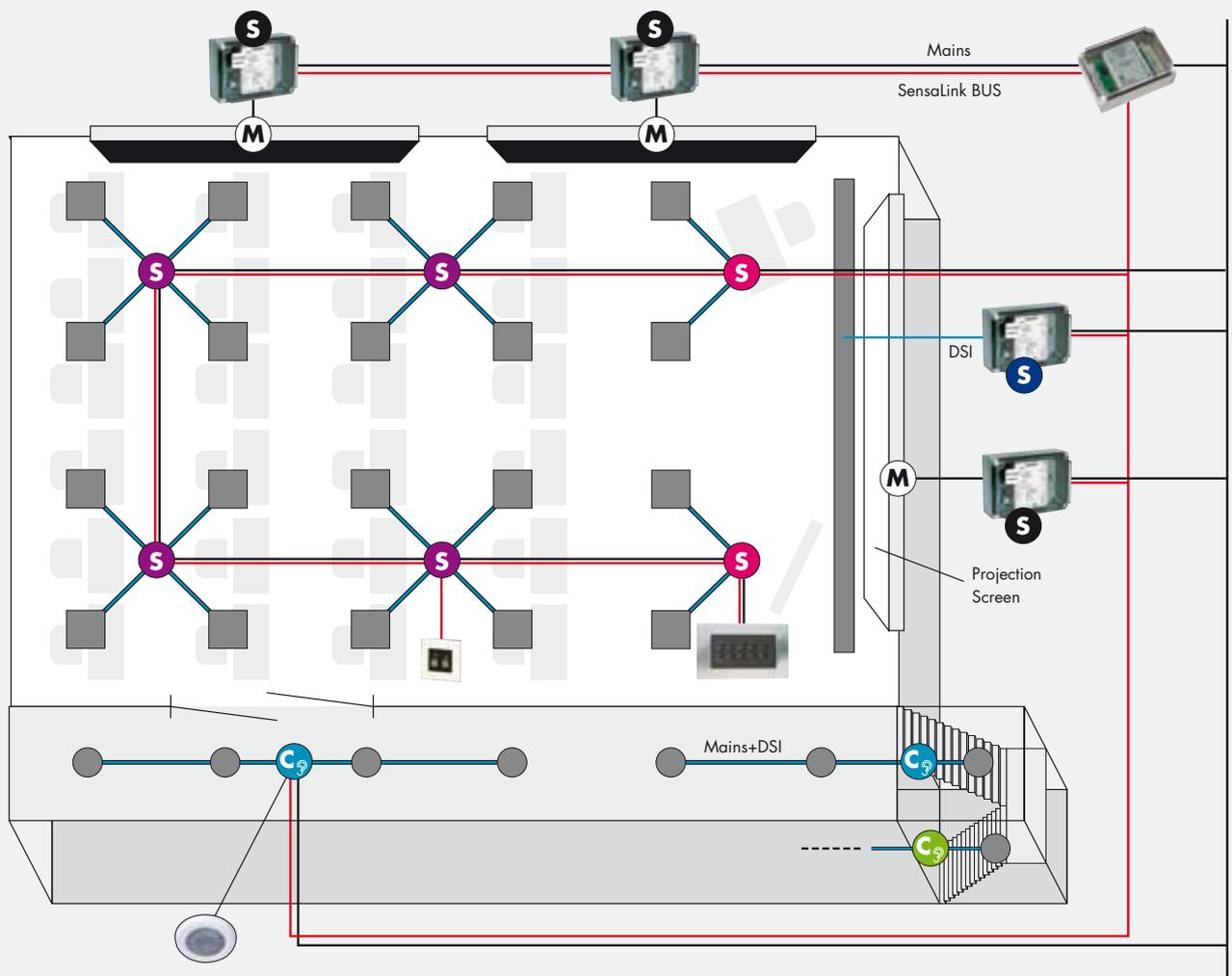
- Rear area lighting and front area lighting controlled individually
- 6 scenes via scene plate next to presenter's area to adapt theatre to different uses
- Simple 2-button controller next to entrance to override rear area lighting if requested
- Auditorium area presence- and (when scene 1 is activated) daylight-linked
- Project screen and blackout blinds integrated
- Corridor and staircase lighting linked with presence and theatre lighting

## How it works:

- The recessed fluorescent luminaires within the lecture theatre (Specline Alpha HFD) are connected to remote SensaLink sensor heads, here with a maximum of 4 luminaires per sensor head.
- The whiteboard fluorescent luminaire (Optus IV HFD) is not connected to a sensor head, but uses a SensaLink Transceiver's DSI output.
- The two motors for closing and opening the blackout blinds are controlled via the switched outputs of two Transceivers.
- The motor for lowering and raising a projection screen at the front of the theatre is connected to a switched output of a Transceiver as well.

- The corridor and staircase is lit by downlights (Cruz HFD), these are connected to remote SensaLink sensor heads.
- The rear and front area lighting together with the whiteboard lighting are allocated to three different Sensor Groups: All three groups show different illuminance levels when a scene is recalled. Within Sensor Group 1 (front area) and within Sensor Group 2 (rear area) information regarding presence is shared.
- The blackout blinds and the projection screen form a separate Sensor Group 4: Within the scenes they are either closed/lowered (ideal for presentations e.g. using digital projectors) or opened/raised.

- A SensaLink Local Control Plate, recessed wall mounted near to the theatre entrance is allocated to Sensor Group 2, and therefore enables the auditorium users to override the rear area lighting if required.
- For the presenter a SensaLink Scene Select Plate is provided, also recessed wall mounted next to the presenting area: It is allocated to all Sensor Groups within the theatre (1 to 4) and provides the possibility to recall six different scenes including lights, blinds and screen. Scene 1 is the daylight-linked one.
- The corridor lighting forms a Common Sensor Group, that "listens" to all other (standard) Sensor Groups within the same bus district: As long as the



lecture theatre is occupied, the corridor and staircase light will stay On and wait until the whole area is unoccupied.

- The whole installation is connected to the SensaLink Bus, that is powered by the SensaLink Bus Power supply.
- In a larger installation, using several Global Bus Power Supplies connected to a building spine, the shown Common Group 2 could be the Building Group of another bus district (and would then be addressed as Common Group 1), sharing occupancy data with e.g. the corridor and staircase lighting in all other bus districts.

#### Devices

-  Recessed luminaire (e.g. Specline Alpha HFD)
-  Whiteboard luminaire (e.g. Optus IV HFD)
-  Recessed downlights (e.g. Cruz HFD)
-  Screen/Blackout blind motor 230V AC
-  Sensor head
-  Scene select plate, allocated to 
-  Local control plate, allocated to 
-  Transceiver (used as DSI or Motor output)
-  Bus power supply

-  SensaLink Bus wire\*
-  Mains wire\*
-  DSI wire\*
-  DSI + mains wire\*

\*Standard mains wiring 1.5mm<sup>2</sup> with solid or stranded conductors, e.g. H05VVU

#### Addresses

Senor allocated to:

-  Sensor Group 1 (front luminaires)
-  Sensor Group 2 (rear luminaires)
-  Sensor Group 3 (whiteboard luminaire)
-  "Sensor" Group 4 (blackout blinds and screen)
-  Common Group 1 (corridor and upper staircase)
-  Common Group 2 (lower staircase etc.)

-  Listening



# Application: open space office

## Specification example:

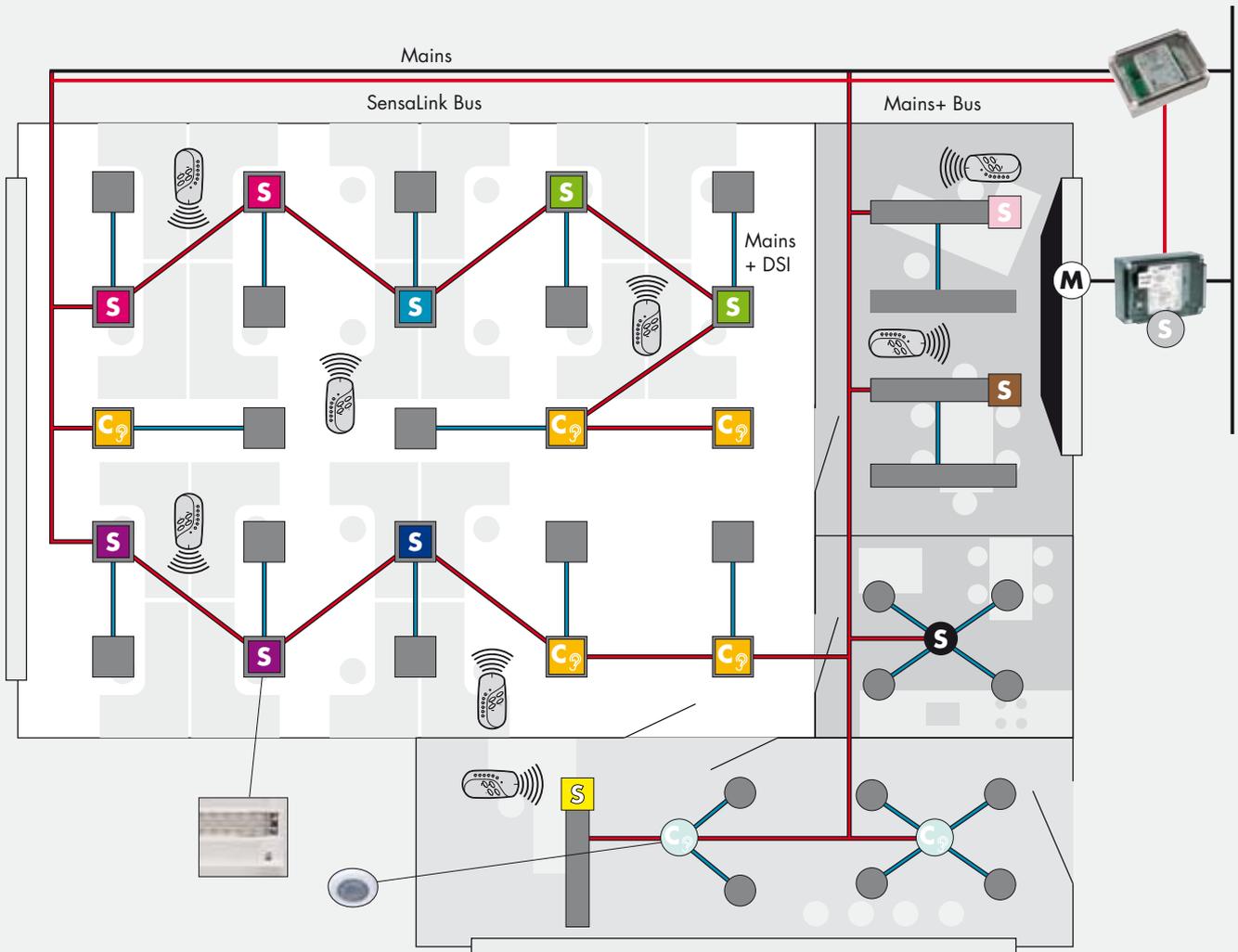
- Whole area presence- and daylight-linked
- Open space with notional corridor and common zone, overrides possible via infra-red hand held controllers
- Separate manager's office with textile blind and meeting table, with 6 scenes recalled via infra-red hand held controller to adapt room to different uses
- Separate room for copy machine and kitchen
- Corridor and reception lighting linked with presence and office lighting

## How it works:

- One half of the recessed fluorescent luminaires within the open space are SensaLink luminaires containing a built-in MiniSensaLink head (MenloSoft SR HFL). The other half are standard dimmable luminaires (MenloSoft SR HFD), connected to the DSI output of the SensaLink ones. Within these master-slave installations, one MiniSensaLink head can control a maximum of 4 DSI ballasts in total.
- The master luminaires are connected to the SensaLink Bus; the slave luminaires are connected to the masters via a Mains/DSI lead.

- Several Sensor Group numbers are used to group the luminaires above different desk areas.
- Master-slave luminaire arrangements can also be found in the manager's office, grouped into two separate groups as this room is used by the manager in two ways, either when working at the desk, or when holding a meeting in the other half of the room.
- The motor closing and opening the textile blind in front of the manager's office's window is controlled via the switched output of a SensaLink Transceiver, that is addressed with an own Sensor Group

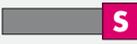
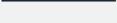
- number: Within the scenes the blind is either closed (ideal when sun shines directly into the room) or opened.
- The lobby and the separate room, for the copy machine and the kitchen, are lit by downlights (Cruz HFD), these are connected to remote SensaLink sensor heads.
- The reception desk is lit by a SensaLink luminaire.
- The lobby lighting forms a Common Sensor Group, that listens to all other (standard) Sensor Groups within the same Bus district: As long as one of the desks, or the manager's office, or the kitchen is occupied, the lobby light



will stay On and wait until the whole area is unoccupied.

- The open space’s notional corridor between the desks and leading to the other areas, is commissioned as a Common Sensor Group as well, and holds the light until all SensaLink luminaires and sensor heads within the whole area are reporting vacancy.
- In general all luminaires are presence and daylight-linked. Only when a scene different from scene 1 is recalled in the manager’s office, is the room’s daylight-link deactivated.
- The manager uses infra-red hand held controllers to set scenes or to brighten and dim the light, one is on her/his desk, the other on the meeting table.
- Also the desk users and the receptionist have infra-red hand held controllers reachable. To dim or brighten the light, they aim the controllers to one of the built-in MiniSensaLink heads. The controllers show 2 pairs of dim buttons, one is for overriding the light output of all luminaires connected to the targeted sensor head, the other pair is for overriding the whole Sensor Group or Common Group, the sensor head is part of.
- The whole installation is connected to the SensaLink Bus, that is powered by the SensaLink Bus Power supply.
- As shown in the drawing the SensaLink Bus wire is partly installed as ring and partly as spur.

**Devices**

-  Recessed luminaire (e.g. MenloSoft SR HFD)
-   Recessed luminaire with built-in MiniSensaLink head (e.g. MenloSoft SR HFL)
-  Suspended luminaire (e.g. Sienna HFD)
-   Suspended luminaire with built-in MiniSensaLink head (e.g. Sienna HFL)
-  Recessed downlights (e.g. Cruz HFD)
-  Blind motor 230V AC
-  Remote Sensor Head recessed mounted
-  Infrared hand held controller
-  Transceiver (used as Motor output)
-  Bus power supply
-  SensaLink Bus wire\*\*
-  Mains wire\*
-  SensaLink Bus\*\*+Mains wire\*
-  DSI wire\*
-  DSI+Mains wire\*

\*Standard mains wiring 1.5mm<sup>2</sup> with solid or stranded conductors, e.g. H05VV-U  
 \*\*Mains rated wiring 1.5mm<sup>2</sup>, twisted pair, with solid or stranded conductors, e.g. H05VV-U

**Addresses**

Sensor allocated to:

-  Sensor Group 1 to 5 (SensaLink luminaires in open space, above desks)
-  Common Sensor Group 1 (SensaLink luminaires in open space, above notional corridors and common area)
-  Sensor Groups 6 and 7 (SensaLink luminaires in manager’s office)
-  “Sensor” Group 8 (textile blind in manager’s office)
-  Sensor Group 9 (remote SensaLink head in separate room/kitchen)
-  Sensor Group 10 (SensaLink luminaire in lobby, above desk)
-  Common Group 2 (remote SensaLink head in lobby)
-  Listening

# Detailed overview on all products and accessories



## 96102982 SENSALINK MRE SENLDDSI

Passive Infra-red (PIR) detector and photocell, responds to presence/absence and to light by dimming or switching off. They can control HFD luminaires incorporating up to 8 DSI ballasts, and can be used in conjunction with an On/Off switch (absence detection). Supplied with a flying lead. Input for momentary action switch for manual override (dim/brighten, switch On/Off). Suitable for flush fitting to a suspended ceiling (max. height 3m, max. thickness 54mm, hole diameter 50mm, ceiling void 125mm). Detection zone radius 6m at 2.4m ceiling height. DSI lead 2-wire digital polarity-free, max. length 12m. SensaLink Bus unscreened twisted pair 1.5mm<sup>2</sup>, polarity-conscious. Photocell; adjusted when commissioned, regulation deactivated when one of the Scenes 2 to 6 is recalled. Degree of protection IP40. Dimensions Ø 65mm, height 115mm, weight 0.07kg excluding lead. Housing flame retardant ABS, white. Operating Voltage 230VAC.



## 96013500 SENSALINK MSF SENLDDSI

Passive Infra-red (PIR) detector and photocell, responds to presence/absence and to light by dimming or switching off. Can control luminaires incorporating up to 8 DSI ballasts, and can be used in conjunction with an On/Off switch (absence detection). Supplied with a connector block. The housing may be secured to a hard surface or a UK standard BESA box. The unit fits into the housing with a simple bayonet action. Detection zone radius 6m at 2.4m ceiling height. DSI 2-wire digital polarity-free, max. length 12m. SensaLink Bus unscreened twisted pair 1.5mm<sup>2</sup>, polarity-conscious. Photocell; adjusted when commissioned, regulation deactivated when one of the Scenes 2 to 6 is recalled. Degree of protection IP53. Dimensions Ø 100mm, height 72mm, weight: 0.2kg. Housing flame retardant ABS, white. Operating Voltage 230VAC.



## Luminaires with built-in MiniSensaLink head

To see which standard Thorn luminaires are SensaLink enabled, look for "HFL" in the descriptions of the relevant luminaire Ordering Guides. If you cannot find one within your selected luminaire range, please contact your sales office.



## 96100101 SENSALINK MRE SENLDSW

Passive Infra-red (PIR) detector and photocell, responds to presence/absence and to light by switching luminaires on and off. Switched live output to operate standard luminaires with magnetic or fixed output HF circuits, for a maximum load of 6A, considering inrush currents, can be used in conjunction with an On/Off switch (absence detection). Supplied with a flying lead. Suitable for flush fitting to a suspended ceiling (max. height 3m, max. thickness 54mm, hole diameter 50mm, ceiling void 125mm). Detection zone radius 6m at 2.4m ceiling height. SensaLink Bus unscreened twisted pair 1.5mm<sup>2</sup>, polarity-conscious. Photocell: adjusted when commissioned, switching regulation deactivated when one of the Scenes 2 to 6 is recalled. Degree of protection IP40. Dimensions Ø 65mm, height 115mm, weight 0.07kg excluding lead. Housing flame retardant ABS, white. Operating Voltage 230VAC.



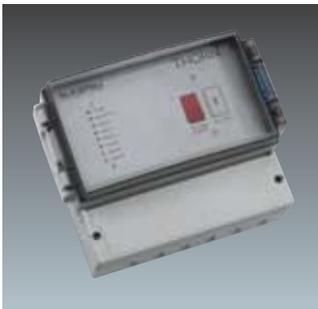
#### 96102983 SENSALINK SENLP

Programmer used to commission a SensaLink system. The programmable parameters of the various products (e.g. illuminance level, time delay to switch off, start-up level, fading, operation mode (auto or semi-auto), addresses and many more) can be configured via this battery-powered, hand held, infra-red unit. The programmer allows commissioning and re-commissioning to be carried out with virtually no disturbance to the building's occupants, as programming is done remotely and therefore can be operated from the ground. Settings are chosen from the menu and transferred instantaneously to the product being programmed by pressing the Upload button. The commissioning engineer receives positive feedback at all stages of the process. Settings from one product can be copied in seconds to another and settings can be checked at any time using the download function. Display 128 x 64 monochrome LCD display. Supply voltage 3 alkaline batteries, type AAA. Dimensions 150x 85x35mm, weight approx. 0.23kg.



#### 96232304 SENSALINK SENPLS LT

Bus Power Supply unit provides the signalling highway for up to 100 SensaLink devices. Bus interconnection cable 1 to 1.5mm<sup>2</sup>, unscreened twisted pair, installed either as radial or ring (may be run with mains cabling): For radial Bus topology, maximum length of each radial is 500m (300m) with 1.5mm<sup>2</sup> (1.0mm<sup>2</sup>) conductor size. For ring Bus topology, maximum length of ring is 1500m (800m) with 1.5mm<sup>2</sup> (1.0mm<sup>2</sup>) conductor size. A centre-off retractable switch can be additionally connected to the 'Wall Switch' Common and Up/Down terminals: This enables to dim, brighten and to switch on and off all SensaLink devices allocated to Sensor Group 1 and 2 within the supplied bus district. Dimensions: 125x175x75mm, weight: 0.12kg. Mounted in ceiling or on wall.



#### 96232305 SENSALINK SENPLS G

Bus Power Supply provides the signalling highway for up to 200 SensaLink devices. Bus interconnection cable 1 to 1.5mm<sup>2</sup>, unscreened twisted pair, installed either as radial or ring (may be run with mains cabling): For radial Bus topology, maximum length of each radial is 500m (300m) with 1.5mm<sup>2</sup> (1.0mm<sup>2</sup>) conductor size. For ring Bus topology, maximum length of ring is 1500m (800m) with 1.5mm<sup>2</sup> (1.0mm<sup>2</sup>) conductor size. In larger applications with more than 200 SensaLink devices, up to 99 of these Bus power supplies can be linked to a common spine or backbone (2x2x0.2mm<sup>2</sup>, twisted pair, screened communication cable, e.g. a RS-232 computer cable, maximum length 1200m). With the spine the Common Sensor Group 1 becomes a Building Group, providing building wide linking of all Common Groups 1 within the different Bus districts. Three pairs of switch input terminals enable central control: With a latching, normally-open switch or a momentary action switch connected to 'All On Full' all lighting is set to full brightness, and go to their 'EntryScene' setting after the switch is released. With a latching, normally-open switch connected to 'Load Shed 1' or 'Load Shed 2' all SensaLink devices allocated to Global Group 1 or 2 can be turned off, and are 'reactivated' (go to their 'EntryScene' setting) after the switch is released. Red Power LED indicates mains power connection. An Activity LED flashes green when there is activity within the Bus district, and flashes red when a Bus installation fault is detected. A yellow Linking LED will flash when several of these Bus Power Supplies are connected together and Building Group (Common Sensor Group 1) linking occurs. Supply voltage 230VAC. Dimensions 213x185x117mm. Degree of protection IP65. Mounted adjacent to the mains distribution board for the area being controlled.



**96102981 SENSALINK SENLRC**

Infra-red hand held Controller provides user with local override facility, allows to select preferred light levels for particular tasks, and to switch the light On and Off: To switch, dim or brighten the light, the controller is targeted to a SensaLink luminaire or multi sensor head. The controller shows 2 pairs of dim buttons, one is for overriding the light output of all luminaires connected to the targeted sensor head, the other pair is for overriding the whole Sensor Group or Common Group, the sensor head is part of. Additionally it enables to set and recall six scenes for the different activities in a room via 6 small buttons. Supply voltage 2 alkaline batteries, type AAA. Operating range: 2.5m. Dimensions: 120x56x22 mm, weight 0.1 kg.



**96237037 SENSALINK SENLSS V2**

Six scenes can be recalled by depressing the appropriate button "1" to "6" on the Scene Select Plate, the active scene is visualised via LED. To set a scene, the lighting levels in the Sensor Groups are set individually using the SensaLink Infra-red hand held Controller, and then one of the scene buttons is pressed and held until the luminaires flash to confirm the setting. Additionally the scene plate provides buttons with dim/brighten and On/Off function (the "ON" button calls up the programmed Entry Scene). Connection for SensaLink Bus unscreened twisted pair 1.5mm<sup>2</sup>, polarity-conscious. IR port for interfacing with SensaLink Programmer or SensaLink Infra-red hand held Controller. To be recessed wall mounted into UK standard double back box (not supplied) for sinking in (min. box depth 30mm) or dry-line plasterboard walls. Supply voltage 230VAC.

**96237037** plus **96237039**

Cover plate (size 85 x 145mm) ordered separately:

**96237038 SENSALINK SENLSS V2 BR POL COVER**

Metal cover polished brass finish for SensaLink Scene Select Plate Version 2

**96237039 SENSALINK SENLSS V2 CHR POL COVER**

Metal cover polished chrome finish for SensaLink Scene Select Plate Version 2

**96237040 SENSALINK SENLSS V2 RS BS COVER**

Metal cover brushed stainless steel finish for SensaLink Scene Select Plate Version 2

**96237041 SENSALINK SENLSS V2 WHI COVER**

Metal cover white finish for SensaLink Scene Select Plate Version 2



**96218671 SENSALINK WHI MWA SENLCP**

Local Control Plate providing the possibility to switch On and Off, and to dim and brighten a group of luminaires. Can be allocated to one Sensor Group number via 'dip' switches. Supplied via SensaLink Bus (consumes 2 bus loads). Connection for SensaLink Bus unscreened twisted pair 1.5mm<sup>2</sup>, polarity-conscious. Available with white plastic cover plate and grey plastic buttons (SENSALINK WHI MWA SENLCP). To be recessed wall mounted into UK standard double back box (not supplied) for sinking in (min. box depth 30mm) or dry-line plasterboard walls.



**96013499 SENSALINK SENLT**

SensaLink Universal Bus Transceiver provides a DSI output for controlling dimmable luminaires incorporating up to 20 DSI ballasts, a switching relay output (maximum load 10A) for switching fixed output luminaires (with magnetic or electronic gears) and non-lighting loads, e.g. screens and blackout blind motors. Additionally features inputs for external devices, e.g. external switches, timers, BMS outputs. Is also used for room partitions, enabling individual control within two rooms when a partition is closed, and joined control of the combined rooms when the partition is opened. Supply voltage 230VAC. Dimensions 175x125x75mm, weight 0.12kg. Mounted in ceiling or on wall.



#### **22154307 PDAX 500VA**

Phase dimmer/Reverse phase dimmer (automatic load detection), controllable via any DSI output, for continuous dimming of ohmic light sources, LV halogen lamps with magnetic or electronic transformers. A total connected load of 40 to 500VA can be operated. Dimming range 1...100%. Connection via screw terminals, housing made of flame-resistant polycarbonate – halogen-free, suited for luminaire installation or ceiling recess, admissible ambient temperature of 0...60°C (max. 300VA)/0...45°C (max. 500VA). Degree of protection IP20. Size 167x42x31mm. Weight 200g.



#### **22154306 PDAS 1000VA**

Phase dimmer/Reverse phase dimmer (automatic load detection), controllable via any DSI output for continuous dimming of ohmic light sources, LV halogen lamps with magnetic or electronic transformers. A total connected load of 40 to 1000VA can be operated. Dimming range 1...100%. Connection via screw terminals, housing made of flame-resistant polycarbonate - halogen-free, suitable for installation in switch or distribution cabinets on 35mm DIN rail. Permitted ambient temperature 0...40°C. Degree of protection IP20. Width 105mm (6 units), height 90mm, depth 59mm. Weight 400g.



#### **86457873 TE one4all sc 105VA**

Digital, dimmable transformer with DSI/DALI interface; controllable via any DSI or DALI output, dimming range of 1%...100%; for operation of 12V low voltage tungsten-halogen lamps with a lamp power of between 20 and 105VA; lamp leads up to 2m; housing made of flame-resistant polycarbonate, halogen-free; suitable for luminaire installation; protection class II; ambient temperature -25...+60°C. Size 167x42x31mm. Weight 180g.

#### **86457874 TE one4all sc 150VA**

Digital, dimmable transformer with DSI/DALI interface; controllable via any DSI or DALI output, dimming range of 1%...100%; for operation of 12V low voltage tungsten-halogen lamps with a lamp power of between 20 and 150VA; lamp leads up to 2m; housing made of flame-resistant polycarbonate, halogen-free; suitable for luminaire installation; protection class II; ambient temperature -20...+50°C. Size 207x46x40mm. Weight 290g.

## Ordering Guide

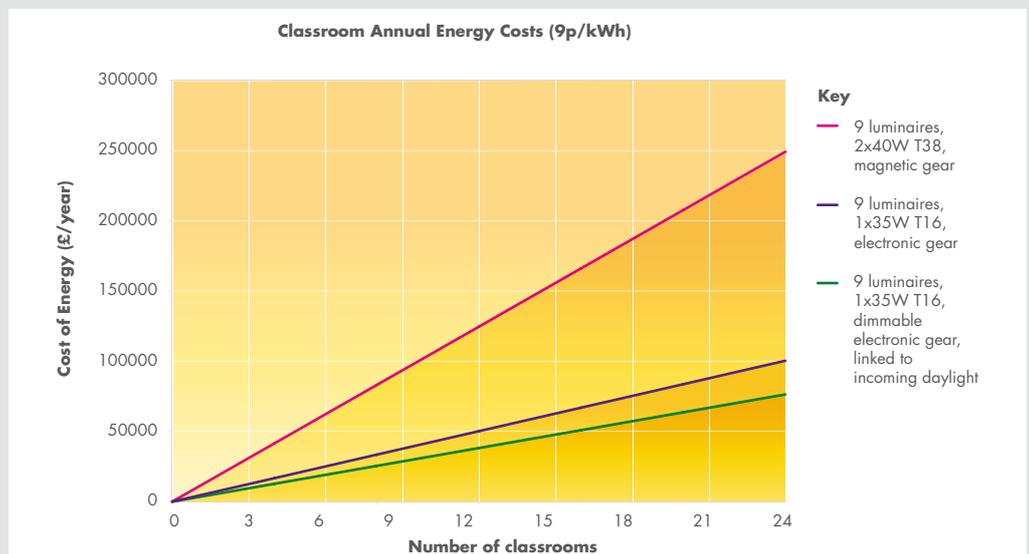
Description	SAP code
<b>Multisensor head with DSI output recessed mounted</b>	
SENSALINK MRE SENLDDSI	96102982
<b>Multisensor head with DSI output surface mounted</b>	
SENSALINK MSF SENLDDSI	96013500
<b>Multisensor head with switched output recessed mounted</b>	
SENSALINK MRE SENLDSW	96100101
<b>Programmer</b>	
SENSALINK SENLP	96102983
<b>Bus Power Supplies, global and lite</b>	
SENSALINK SENLPS G	96232305
SENSALINK SENLPS LT	96232304
<b>Infrared Hand held Controller</b>	
SENSALINK SENLRC	96102981

Description	SAP code
<b>Scene Select Plate and Covers</b>	
SENSALINK SENLSS V2	96237037
SENSALINK SENLSS V2 BR POL COVER	96237038
SENSALINK SENLSS V2 CHR POL COVER	96237039
SENSALINK SENLSS V2 RS BS COVER	96237040
SENSALINK SENLSS V2 WHI COVER	96237041
<b>Local Control Plate including cover</b>	
SENSALINK WHI MWA SENLCP	96218671
<b>Universal Transceiver</b>	
SENSALINK SENLT	96013499
<b>Accessories / DSI/DALI transformer, 12V, 20-105VA and 50-150VA</b>	
TEone4all 105VA	86457873
TEone4all 150VA	86457874
<b>Accessories / DSI phase or reverse phase dimmer, auto load detection, 40-500VA and 40-1000VA</b>	
PDAX 500VA	22154307
PDAS 1000VA	22154306

## Energy efficiency

### Annual Energy Costs - Application example Classrooms

Energy savings start to build when you consider the number of rooms within a building and the difference between old and new lighting technologies. As an example: The comparison between 1970's classrooms and those of today (with and without daylight-linking) clearly shows significant cost savings are available. The example is based on a typical 1970 classroom lighting installation of nine fittings each with 2x40W T38 lamps and magnetic gear, compared to a typical 2009 classroom of nine fittings each with 1x35W T16 lamp and electronic gear, and finally the same modern classroom with the dimmable versions of the same luminaires linked to the incoming daylight using Sensalink (maintenance based on 16000 hours, 2480 hours use per annum with varying lighting durations based on time of day).





# THORN

Lighting people and places

## Thorn Lighting Limited

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Tel: 020 8732 9898  
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E-mail: brochures.uk@thornlighting.com

**[www.thornlighting.co.uk](http://www.thornlighting.co.uk)**

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