The Intelligent Lighting System (ILS) is one of the most advanced lighting and energy management systems available today. System intelligence is built into every luminaire, monitoring and reacting to occupancy, pre-selected light levels and changes in ambient daylight levels. Absence functionality is incorporated to maximise energy saving and controls factor compliance with building regulations.

The result is a highly efficient and intelligent system, which is easily re-configured as room layout or usage changes, via a simple hand-held infra-red programmer. Importantly, ILS fully considers the human dimension. Luminaires communicate with each other, allowing selected fittings to switch on together offering a pleasant, safe and correctly illuminated environment. A handy infra-red override unit also provides local control for individuals on a temporary basis. Whatever the application, ILS delivers automatic energy savings combined with outstanding flexibility.

- Energy saving - typically between 50% and 70%
- Occupancy detection, daylight linking and constant illumination
- Absence functionality (manual on, auto off) maximises energy saving and compliance with building regulations and ECA control factors
- Flexible programming via a hand-held unit
- Luminaire communication for high light quality via BUS communication loop
- User infra-red override facility for local control
- Simple to install and set up
- Easy to re-configure when office layout changes
- Groups can be created and controlled together
- Choice of standard 50mm ‘cube’ or mini head sensor to best suit the chosen luminaire or application
- Designed for use with DALI dimming control gear (DSI or Analogue 1-10V versions to special order)
Standard System Features

ILS is a highly sophisticated and advanced lighting and energy management tool. However, it is easy to install, set up and re-configure, to accommodate the needs of the modern working environment. Intelligence is built into every luminaire, with a wide range of set-up parameters available to configure the system to the exact needs of the installation. All features are set-up via a hand held infra-red master programmer and can be summarised as follows:

- Absence function
- Occupancy detection
- Luminaire communication
- Daylight linking
- Constant illumination
- Illumination control
- System set-up
- Group dimming

Presence / Absence Detection

In a typical office environment, people are away from their workstations between 20% and 40% of the time, during which period luminaires could generally be switched off. ILS uses a passive infra-red (PIR) presence detection system fitted within each luminaire, which turns the luminaire while people are present, but off shortly after they leave. This can be programmed for absence functionality.

PIR detectors have a sophisticated lens which divides the area into three dimensional zones. Crossing from one zone to another triggers the device. Generally, the closer the person is to the PIR, the closer the zones and therefore a smaller movement is needed to trigger the device.

ILS uses a 360° lens which has a high zone density immediately beneath the luminaire to detect small movements, ensuring the luminaire remains lit when reading or writing at a desk. Further away, larger movements are required. As luminaires are usually spaced less than 3 metres apart, people are almost always working in detection zones of high sensitivity.

Absence Function

Many lighting control systems historically worked on presence detection and would activate the luminaires whenever occupancy was detected. This meant that although the system may have daylight monitoring and account for natural daylight and dim/brighten fittings accordingly, they would be on when in some cases they may not need to be.

Absence detection, as it is often referred to, requires the user to manually demand the lights on, usually by means of a simple wall switch. This can result in further energy savings as the luminaires will only be switched on when they are needed, regulate accordingly during operation, then switch off following the pre set time delay after the sensor last detected occupancy.

Absence is now an acknowledged energy saver and has been integrated into recommendations for many energy related incentive schemes. The manual ‘on’ command can be activated by a number of inputs. Please contact our technical department for further information.

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Luminaire Communication System

Most commercially available presence detection luminaires act independently and turn off if no one is directly under them. Whilst providing energy savings, it can lead to intimidating circumstances. In addition, individual luminaires generally do not provide the correct illumination level or adequate uniformity. Staff working late could be left sitting in a pool of light, surrounded by intimidating darkness or have to negotiate a dark corridor, where luminaires only switch on as the person passes under them.

ILS solves this problem by enabling luminaires to communicate with each other. Every luminaire can be programmed with up to 4 of 100 available address numbers. When a luminaire is activated, by detecting presence beneath it, a signal is sent out via the 2 wire communication BUS to every other luminaire.

Any sharing the same address number will switch on. As a result selected surrounding luminaires can be instructed to remain on, along with chosen luminaires on a notional walkway or by doors. This ensures the correct level of illumination and recommended uniformity wherever people are working, along with essential circulation lighting.

An additional feature is common zone addresses. Any luminaire can have a common zone address allocated, as one of the 4 addresses. If designated with a common zone address, that luminaire will switch on or stay illuminated if any other luminaire on the BUS is activated. This feature is useful to instruct selected areas, e.g. stairway luminaires to stay on if any person is in the building. Additionally 2 corridor zones can be created to activate a corridor or area triggered by another occupied space.

As building layout or usage is changed, the address numbers allocated to any luminaire can be simply re-programmed via the infra-red master programmer, effortlessly accommodating the ever increasing churn rate experienced in commercial buildings.

For further information contact our technical support and application department on 01302 303240 or email LightingTechnicalUK@Eaton.com.
Daylight Linking

Natural daylight can often provide either sufficient or a significant contribution to workplace illumination, particularly in the 5 metre area next to windows known as the window zone. Potential savings due to daylight alone are typically between 50% and 70%, dependent on the size, position and compass direction of windows. However, most people will not turn off the lights and the perceived difference between 100% on and switched off appear to be large. Additionally, turning the lights off will affect everybody, including some who may still require illumination.

ILS overcomes this by having a built-in light sensitive cell that monitors daylight levels and adjusts lamp output accordingly, so that the pre-set light level is maintained. As daylight becomes available, the luminaires react by dimming the lamps, continuing until minimum output is reached. With continuing or sustained daylight availability, the luminaires can be instructed to stay on and continue to operate at low levels of output, or switch off after a timed period. If daylight decreases, lamps are automatically brightened to maintain the pre-selected light level.

Each luminaire reacts independently, to take into account that the further away from the window it is installed, the influence of daylight decreases. ILS automatically compensates for light received from other luminaires and the use of window blinds or curtains. It also has a built in time delay so that it is unaffected by temporary changes in level due to reflections or clouds passing over the sun. The luminaire provides light according to the actual conditions directly beneath it.

Using a conventional luminaire, artificial light is needed at the start and end of the day, but provides too much light for most of the day (because of daylight) thus wasting energy.

ILS daylight linking feature reduces light output and energy used but ensures that the installation has enough light.
**Constant Illumination**

Light output from all luminaires reduces over time, as lamps age and the optics get dirty. Room surfaces also accumulate dust and dirt. Standard lighting design practice compensates for this depreciation by increasing initial illumination levels, according to maintenance and cleaning plans. When the installation is new or following maintenance and re-lamping, this leads to overlighting and energy wastage with conventional luminaires.

ILS automatically compensates for this, dimming the lamps initially so that the designed, pre-set level is achieved when lamps are new. As lamps age and optics accumulate dirt, the luminaire automatically increases power to the lamps to maintain the desired illumination level. This delivers substantial energy savings over a conventional installation, typically between 10% and 20% dependent on maintenance intervals. A further benefit is improved visual comfort, as over lighting is eliminated.

**Illumination Control**

The problem with most conventional lighting systems is that:

- They deliver a fixed illumination level
- They are expensive to reconfigure if the office layout or use changes
- They cannot be dimmed if the light level is higher than required
- They cannot be brightened if more light is required

These problem areas are solved by using ILS luminaires, as they can be set to operate at any light output within their range, either individually or as a whole. This is set up using the infra-red master programmer, to provide illumination that achieves the recommended level to perform general or specific tasks. Light levels can be accurately set, as the programmer can instruct each luminaire to operate at any value setting between minimum and maximum output of the ballast. If the usage of an area changes on a long term basis, the master programmer can be used to quickly re-configure the pre-set level. The luminaires will then continue to react automatically to changes in ambient daylight and compensate for lamp ageing, to maintain the set level.

Temporary dimming or brightening of luminaires can be achieved by a simple push button, hand held controller or switch plate on the BUS loop. They can be used to individually dim luminaires for presentations, or to brighten levels for detailed work. Luminaires can also be turned on or off. Adjustment using these controllers fixes the light level and prevents automatic regulation. When the area is vacated, the luminaire switches off and automatically returns to its original settings. Luminaires can also be reset into automatic mode by pressing one button on the controller.

For further information contact our technical support and application department on 01302 303240 or email LightingTechnicalUK@Eaton.com.
System Set-up

System set-up is carried out after installation. A portable infra-red programmer is required, which transmits all set-up instructions to a receiver within the luminaire. Once programmed, the luminaire will retain its settings, even in the event of a power failure. Re-programming is easy - new instructions are simply transmitted to the luminaire. Eaton provide a commissioning service, during which the programming procedure is demonstrated to the designated individual responsible for adjustments to system settings after the installation is complete. A full specification of required settings is needed prior to commissioning.

The following parameters can be set:

- **Light Levels**
  Luminaires can be set to the same or different levels according to the task needs. They then automatically compensate for contribution from daylight and surrounding luminaires.

- **Luminaire Communication**
  Up to 4 addresses can be programmed, from 100 available channel numbers. Luminaires with common addresses are all turned on if any one luminaire with the same address detects presence via the built-in PIR detector.

  Up to 2 common zones can also be programmed addresses within the maximum of 4 addresses which turn on the luminaire if any other sensor connected to the BUS is activated, which is useful for corridors, toilets and circulation areas.

  Common zone 1 can operate across the communication spine between BUS power supplies. Common zone 2 is local to one BUS power supply only.

- **Time Delay**
  Sets time span between last detected movement and luminaire switch off. Adjustable between 30 seconds (for testing) and 96 hours. Continuous operation can also be selected, requiring a means of isolation or use of a hand-held controller to switch on or off.

- **Background Light Mode**
  Normally when an area is vacated, luminaires switch off after a selected period of time. This can lead to poor lighting quality and unacceptable uniformity for anybody left working alone in the area, particularly in open plan offices. At night this can also be intimidating, if sat in a pool of light surrounded by darkness.

  The background light mode overcomes these issues offering a choice of states for the luminaire to adopt once occupancy is no longer detected. The options are to switch off or:
  
  1) Dim to the ballast minimum
  2) Go to a specific level by selecting ‘scene 6’ (default 5% but can be re programmed)
  3) Regulate to a maximum of 25% of ballast output

  For each of the 3 options above the luminaire can remain at that state, or remain at this level for 3 hours (some sensors remain at the level for 3x the preset time delay, not 3 hours) then switch off, or maintain that level until the building is vacated (ILS or ISM communicating version only)

- **Power up mode**
  Instructs luminaires to either turn on when power is first applied, or remain off until movement is detected. Important for large installations, to reduce start-up load following power failure, whilst allowing selected luminaires to power up immediately, such as on stairways or in circulation areas.

- **Bright-out Mode**
  If bright-out is selected, the luminaire switches off if the ambient daylight levels rise to 25% or more of the pre-programmed required light level. The PIR continues to monitor movement, so that when ambient levels fall, the luminaire switches back on if the area is still occupied. Bright-out has active priority, so if anyone enters an area with sufficient natural light, the luminaire will not come on until daylight falls to the level set in the luminaire by the programmer. If bright-out is not selected, luminaires will remain at minimum output during periods of occupancy and high ambient levels.
System Components

- **Luminaires**
  All ILS luminaires are supplied with digital high frequency dimming control gear and a built-in ILS detector, which contains all system controls and intelligence in an unobtrusive housing. Product pages indicate if ILS variants are available.

- **2-Way Digital Programmer: LCSQSP**
  Hand held commissioning device with key pad and LCD display. Required for performing all programming functions, by authorised personnel. Menus are accessed and data selected using the previous, next and select buttons, prompted by clear screen messages. Send button used to programme luminaire with selected functions. Read button to interrogate and download luminaires settings. A timesaving feature is the ability to upload or download all setting parameters in one go allowing settings to be copied from one sensor to the next.

- **Infra-Red Controller: LCSQC**
  The LCSQC hand held controller can be used to set basic parameters on the Intelligent Lighting System. It is also compatible with the stand alone sensors. It provides simple day-to-day actions such as on/off override and light level adjustment.

- **Quick Set Remote Controllers: LCSQS**
  Compact ergonomically designed unit with soft-touch push buttons. Provides users with on, off and dim, brighten functions for individual and groups of luminaires. Additional buttons allow for changing of time delay settings on absence or presence detection.

- **BUS Communication Cable**
  A standard mains insulated 2 core unscreened twisted pair cable of 1.5mm² cross-sectional area is recommended. Installed between all luminaires to provide communication link. The cable may be run in a radial, star, tee or ring format. A ring circuit provides a higher degree of integrity, with communication fully retained if a single point of interruption is experienced. Cable length should not exceed 1500m, subject to topology. Polarity must be observed when connecting the BUS cable to each luminaire.

- **BUS Power Supply**
  There is a choice of power supplies to drive the BUS loop, the larger BPS200 can power up to 200 devices on the loop, with the smaller BPS100 unit operating up to 100 devices. On larger systems the BPS200 can be linked to another BUS loop powered by a second BPS200.

- **Wall Plate**
  The manual wall plate LCSWP3S is a useful addition to the system enabling local control of those luminaires assigned to the same zone address as the wall plate. It connects to and draws its power from the BUS loop and occupies 2 device nodes on the system.
  3 pre-set scenes can be selected as well as providing the ability to dim, brighten and switch off the luminaires as required.
System Design and Installation

- ILS lighting design is carried out exactly as a conventional system would be, selecting available luminaires fitted with ILS controls. Page 419 indicates the ranges available with the intelligent lighting system.
- A recognised means of isolation is required to facilitate maintenance and re-lamping.
- A mains power supply is connected in the normal way to luminaires and the BUS power supply.
- An additional 2 core BUS cable is required to allow luminaires to communicate with each other. Although only a low voltage signal (15V) is carried, a 1.5mm² mains voltage insulated unscreened twisted pair cable is recommended, for complete electrical safety and to allow the cable to share trunking or conduit with mains voltage supply cables. Polarity must be observed when connecting the BUS cable to each luminaire.
- When using the BUS communication cable to link the sensors, any switchplates or the accessories on the loop, a Bus Power Supply is required. Two power supply options are available. (See system components section).
- The luminaires are set-up after installation, using the hand held Infra-Red Master Programmer.
- Eaton can offer a full commissioning service, including a full demonstration of programming to a designated individual.
- Contact our technical support and application department for advice on design or system application.

Luminaire Compatibility

Luminaire ranges particularly suited to this integrated mini-sensor and BUS communication include recessed, surface and continuous systems such as: Lechenti, Combiform, Laserline, Synthesis, ACoustic SYStem, Crompack 5 and other fluorescent luminaires requiring a small sensor with the features described.

For further information contact our technical support and application department on 01302 303240 or email LightingTechnicalUK@Eaton.com.

Simple wiring schematic
This range of sensors are able to control a number of compatible luminaires and replace the previous 'Intellect' Groupmaster units. Groupmaster provides the opportunity to utilise intelligent lighting controls where it is not possible to use individual intelligent luminaires, perhaps for reasons of budget constraints. Groupmaster provides the benefits and set up features of the ILS 'Intelligent lighting system', but with reduced equipment costs. Supplied as a stand alone unit, each Groupmaster can operate a number of luminaires fitted with switching or digital dimming control gear, sharing light level and on/off control signals. Although offering less flexibility than using individual intelligent luminaires, as special features such as communication or background light mode are shared, Groupmaster provides a cost effective solution.

- Competitive energy management package
- Energy saving - typically between 50% and 70%
- Group operation of on/off and light level control
- Presence/absence detection, daylight linking and constant illumination
- Easy to set-up minimising installation time
- Absence functionality via manual wall switch or hand held override maximising energy efficiency
- Individual sensors or communicating versions linked by BUS wiring loop
Standard System Features

Groupmaster Detectors are supplied as a stand alone control unit, for surface or recessed mounting into ceiling systems. System features depend on the exact sensor selected and may include:

Groupmaster Functions (variant dependent)
- Absence function
- Occupancy detection
- Daylight linking
- Constant illumination
- Illumination control
- Infra-red system set-up
- Stand alone operation or BUS loop communication
- Background light mode

System Components
- Groupmaster Sensor
  Take care to select appropriate switching or dimming variant.
- Luminaires
  Compatible luminaires fitted with digital high frequency dimming or switching control gear. A comprehensive list of luminaires suitable for use with Groupmaster can be provided by contacting our technical support and application department.

System Design and Installation
- Groupmaster system lighting design is carried out exactly as a conventional system would be, selecting compatible luminaires that are available fitted with high frequency dimming or switching control gear.
- Light switches are not essential, although a recognised means of isolation is required to facilitate maintenance and re-lamping.
- Groupmaster units should be located in the most appropriate position for detection purposes. In large areas this is generally in the centre of each group. In small areas, it is likely to be more beneficial over the task area.
- A mains power supply is connected to the luminaires and Groupmaster units.
- An additional 2 core communication BUS cable is required to link control units in ILS Groupmaster installations. Polarity must be observed when connecting the BUS cable to each Groupmaster unit.
- Where ILS Groupmaster sensors are linked with a BUS wiring loop a BUS power supply will be required.
- The sensors are set up using the 2-way digital programmer (LCSQSP).
- We recommend that you contact our technical support and application department for advice on design and system application as Groupmaster is highly project specific.
Stand Alone High Level PIR Detectors

These high level PIR and photocell detector are a superb addition to the range for the control of luminaires in high ceiling applications such as warehouses, factories and large retail premises.

Available as a flush fit recessed unit or with a surface mount housing, the detector can be mounted remotely or integrated onto the appropriate luminaire and is available in DSI or DALI digital dimming compatible format as well as a simple 6A switching variant.

For high mounting heights the detection pattern has a 1 to 1 ratio of detection beam diameter to mounting height, such that at 16m mounting height the detection zone diameter on the floor is 16m.

For mid range mounting heights there is a family of sensors with a lens suitable for up to 12m heights with a detection cone diameter of 1.75 x height.

These detectors can be used to control up to 25 digital dimming ballasts. It is supplied with factory default settings which may suit the majority of installations however it has the facility for the time delay, light level and other commissioning parameters to be set via the 2-way digital programmer (LCSQSP).

This sensor can be supplied integrated onto the Linergy range of high efficiency T5 luminaires, simply add the ‘IHP’ prefix to the luminaire part number, the luminaire control gear suffix will dictate the DSI, DALI or Switched option.

Please contact your local Eaton representative or our sales team for further information on the controls and their compatibility with other luminaire ranges.

The DALI versions now have a default 100 hour lamp burn in period to operate the lamp at 100%. This can be reactivated following lamp changes with the I.R. master programmer.

Mains Voltage Detectors

A selection of standard mounting height microwave and PIR sensors with and without photocells are also available. Please refer to the catalogue part number table on page 431.

The maximum recommended mounting height for these is 3m, producing a detection diameter from the PIRs of 2.4 x mounting height at the floor level.

These are mains voltage sensors with the facility for manual dimming override on the digital dimming variants via a retractive switch.

Refer to the manual dimming function operation on page 432. A latching switch may also be placed in parallel to override the occupancy detection.

Dimensions

Flush mount option

Surface mount option

Maximum recommended mounting height 16m

Maximum recommended mounting height 12m

360° cone shaped detection pattern diameter at floor = 1 x height

360° cone shaped detection pattern diameter at floor = 1.75 x height

Linergy II with Integral Sensor
Inrush current on LED luminaires can limit the number of luminaires that can be linked to a switching sensor. For further information contact our technical support and application department on 01302 303240 or email LightingTechnicalUK@Eaton.com

### Accessories

#### Catalogue Numbers

<table>
<thead>
<tr>
<th>Description</th>
<th>Cat No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital 2 way programmer</td>
<td>LCSQSP</td>
</tr>
<tr>
<td>Infrared user controller</td>
<td>LCSOC</td>
</tr>
<tr>
<td>Infrared programmer</td>
<td>LCSQS</td>
</tr>
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</table>

### Groupmaster Detectors

#### Catalogue Numbers

<table>
<thead>
<tr>
<th>Cat No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPS200</td>
<td>BUS Power supply 200 Device Capacity</td>
</tr>
<tr>
<td>BPS100</td>
<td>BUS Power supply 100 Device Capacity</td>
</tr>
<tr>
<td>LCSWP3S</td>
<td>Wall Plate override switch 3 acenes, Dim/Brighten, Off</td>
</tr>
</tbody>
</table>

#### Stand Alone Mains Rated Sensors: High Mounting Height up to 16m

- IHPDF: PIR and Photocell High Level 230V DSI Flush Mount
- IHPFRS: PIR and Photocell High Level 230V DSI Surface Mount
- IHPDDF: PIR and Photocell High Level 230V DALI Flush Mount
- IHPDDS: PIR and Photocell High Level 230V DALI Surface Mount
- IHPSF: PIR and Photocell High Level 230V 6A Switching Flush Mount
- IHPS: PIR and Photocell High Level 230V 6A Switching Surface Mount
- ILSIHPDDF: PIR and Photocell High Level 230V DALI Flush Mount with BUS loop connectivity
- ILSIHPDDS: PIR and Photocell High Level 230V DALI Surface Mount with BUS loop connectivity

#### Stand Alone Mains Rated Sensors: Mid Mounting Height up to 12m

- IMPRD: PIR and Photocell Mid Level 230V DSI Flush Mount
- IMPRD: PIR and Photocell Mid Level 230V DSI Surface Mount
- IMPDDF: PIR and Photocell Mid Level 230V DALI Flush Mount
- IMPDDS: PIR and Photocell Mid Level 230V DALI Surface Mount
- IMPFSF: PIR and Photocell Mid Level 230V 6A Switching Flush Mount
- IMPSS: PIR and Photocell Mid Level 230V 6A Switching Surface Mount
- ILSIMPDDF: PIR and Photocell Mid Level 230V DALI Flush Mount with BUS loop connectivity
- ILSIMPDDS: PIR and Photocell Mid Level 230V DALI Surface Mount with BUS loop connectivity

#### Stand Alone Mains Rated Sensors: Standard Mounting Height, up to 3m

- IMPRF: PIR and Photocell 230V DSI Flush Mount
- IMPRS: PIR and Photocell 230V DSI Surface Mount
- IPDDF: PIR and Photocell 230V DALI Flush Mount
- IPDDS: PIR and Photocell 230V DALI Surface Mount
- IPSF: PIR and Photocell 230V 6A Switching Flush Mount
- IPSS: PIR and Photocell 230V 6A Switching Surface Mount
- IMDS: Microwave and Photocell 230V DSI surface/semi-rec mount
- IMS: Microwave and Photocell 230V 10A Switching surface/semi-rec mount
- ILSIPDDF: PIR and Photocell 230V DALI Flush Mount with BUS loop connectivity
- ILSIPDDS: PIR and Photocell 230V DALI Surface Mount with BUS loop connectivity

Inrush current on LED luminaires can limit the number of luminaires that can be linked to a switching sensor.

For further information contact our technical support and application department on 01302 303240 or email LightingTechnicalUK@Eaton.com
Simple on/off and dimming control is often required in many types of application, particularly in areas where audio-visual presentations are conducted. The Manual Dimming System achieves this without the need of complicated controls or dimming racks, simply by using momentary push buttons plus Eaton luminaires fitted with digital regulating control gear. Installation is straightforward, with luminaires only requiring a standard power supply and an additional switched live, via the push button. No complicated set up is required, just push and hold the button down until the desired illumination is reached. Precision control is easily achieved by using the Manual Dimming System.

- Simple dim/brighten control
- Easy to install and use
- Silent, stable, precision control
- Soft on/off feature
- Comprehensive range of compatible luminaires
**System Operation**

- Luminaires to be controlled should be fitted with digital high frequency regulating control gear.
- Each luminaire requires a standard, permanent live mains power supply, plus a switched live supply and neutral reference via a momentary push button switch.
- Luminaires are switched on or off by a short push of the switch. Luminaires will switch on at their previous light level.
- Pushing and holding the switch will dim the luminaires. Releasing and then holding again will increase the luminaire brightness. Operation will toggle between on/off or dim/brighten each time the switch is pressed or held on.

**System Components**

- **Switch**
  Momentary push button fitted in a white single gang switch plate.
- **Luminaires**
  Compatible luminaires fitted with digital high frequency regulating control gear. To specify luminaires, change the ‘S’ or ‘Z’ suffix to ‘RD’. A comprehensive list of luminaires suitable for use with the Manual Dimming System can be provided by contacting our technical support and application department.

**Options**

Emergency converted luminaires can be used with this system, specifying the appropriate luminaire to be used complete with digital high frequency regulating control gear. Contact technical support for full details.

**Specification**

To specify state: Dimming system providing manual on/off/dim/brighten functionality, using digital high frequency regulating luminaires controlled by momentary push button switch, as Eaton’s Manual Dimming System, part no. ____________

**System Design and Installation**

- Lighting design is carried out exactly as a conventional system would be, to determine the quantity of luminaires required.
- System designed for up to 10 luminaires.
- Specify the luminaires to be fitted with digital high frequency regulating control gear.
- Connect all luminaires to a permanent live mains supply. It is recommended that a suitable means of isolation is provided for routine maintenance purposes.
- An additional momentary switched live supply via a push button switch is required for on/off/dim/brighten control.
- The luminaire ballast also requires a common neutral connection. This can be taken from the unswitched mains supply. However, to allow flexibility and permit other controls to be connected in the future, it is recommended that an additional neutral is run alongside the switched live supply.
- On/off and dim/brighten control is manually accessed by a short press or press and hold of the push button.
- Additional control switches can be added for two way switching etc. Any additional push buttons should be connected in parallel.

**Catalogue Numbers**

<table>
<thead>
<tr>
<th>Cat No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCSDPB</td>
<td>Momentary push button switch - on/off/dim/brighten control</td>
</tr>
</tbody>
</table>

Typical Manual Dimming System wiring schematic
Integrated Occupancy and Photocell Sensors

With the lighting load of a commercial building accounting for around 30% of the energy to run it, reducing the lighting load through controls and daylight harvesting can have a significant effect in reducing the energy consumed. This is a win win where the building operator reduces running costs, the occupant receives an improved lighting scheme and it is also of benefit to the environment.

Full dimming and daylight harvesting functions are provided by the Intelligent Lighting System described on page 419 and the LCM on page 438.

Standard Height Integrated IP Sensor

The IP sensor provides basic PIR occupancy detection and a photocell for daylight threshold switching.

The daylight threshold is set so the sensor will hold off the luminaire if there is sufficient ambient light.

If there is insufficient ambient light and occupancy is detected by the PIR the luminaire will be switched on. The luminaire will remain on while occupancy is detected and then for the set time delay after no further occupancy.

Setting the time delay and light level threshold is achieved by 2 rotary potentiometer on the sensor head.

The standard sensors have a recommended mounting height of up to 3m and create a detection cone with a diameter of 2 x mounting height on the floor for seated activity, 2.4 x mounting height for walking towards the sensor and up to 4 x mounting height for walking across the detection zone.

Common Features of the Standard and Intergrated ‘IP’ Sensors:

- Elegant sensor head linked to a slimline control module via RJ plug for simple integration into luminaires
- The sensor heads are retained by simple spring clips in the requisite hole cut out of ~ 28mmØ
- A photocell for threshold light level switching control with adjustment from 10 to 2000 lux via the rotary potentiometer on the sensor head
- They can be stand alone within a luminaire or operate as master/slaves with appropriate wiring (available on request)
- The master slave arrangement takes the lux reading of the master only, the slaves operate on occupancy only
  It is recommended to position the master furthest from the natural light so as not to cause slave luminaires to be over dimmed
- The time delay can be set between 15 seconds and 30 minutes using the rotary potentiometer on the sensor head
- The ambient temperature range is -25° to +50° (luminaire ambient range may differ)

Luminaire Range Compatibility

The ‘IP’ sensor is a standard option on Crompack 5 battens and Modulay recessed luminaires used with louvre accessories.

It provides switching with occupancy on HF control gear and can invoke “corridor function” when used with compatible dimming control gear.

For further information contact our technical support and application department on 01302 303240 or email LightingTechnicalUK@Eaton.com
This discrete microwave detector is supplied already integrated into our luminaires to provide occupancy/motion detection with simple adjustment of detection range, time out and switching light level.

- Simple set up and operation
- Up to 360° detection (subject to mounting orientation)
- 1m to 5m diameter detection range, up to 8m diameter
- 2 to 30 lux switching for twilight operation subject to mounting and luminaire compatibility
- 5 sec to 25 min time delay

Function

An HF or microwave detector operates differently to a Passive Infra-Red detector (PIR), it is important to understand the main operational differences to ensure the correct device is used for the application.

Unlike motion detectors with PIR technology, this high frequency (HF) motion detector emits a 5.8 GHz signal. Movement is detected by a change in frequency of waves reflected by a moving object within the detection zone. Vibration or moving machinery may also trigger the device.

The HF detectors are almost temperature-independent, whereas temperature is the basis for the PIR motion detectors temperature measuring process.

Infra-red waves from a PIR detector do not pass through walls, but high frequency waves can do. As a consequence, it may not be possible to have the clear boundary of a room wall when using an HF occupancy detector. Therefore, movement of people or machinery in adjacent rooms may also be detected and activate the device, resulting in lights activating unnecessarily.

The HF sensor is ideally suited to integration within luminaires with panels or diffusers through which a PIR’s detection and functionality may be impaired.

The sensor is often set to daylight to deactivate the photocell to avoid false switching due to proximity to the lamps.

Dimensions

<table>
<thead>
<tr>
<th>Integrated Microwave Detector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection Zone</td>
</tr>
</tbody>
</table>

Wall Mounting

- 8m detection
- 1m detection

Ceiling Mounting

- 8m detection
- 1m detection

Range/Sensitivity

Detection

Range and sensitivity can be set by the 3 dip switches. The chosen range can be varied from 1 to 5m. Avoid locating the device near a heating or air conditioning source.
Set up and Operation
Please read all the information contained in these directions prior to any set up or servicing.

Isolate the device from the mains power supply before carrying out any installation, maintenance or servicing.

The device will generally be pre installed into a luminaire ready for set up with no additional installation or connection required.

Light Level Setting
The chosen light response threshold can be infinitely varied from approx. 2 to 30 lux or disabled using the dip switches.

Time Setting
The light can be set to stay ON for any period of time between approx. 5 sec and a maximum of 25 min using the dip switches.

Any movement detected before this time elapses will re-start the timer.

There will be no twilight evaluation (daytime operation) for as long as the motion detector is switched on.

Note: After the light switches OFF, it takes approx. 1 sec before it is able to start detecting movement again.

Test Setting
In order to adjust the detection range during the day, the light level value must be set to daylight and time should be set to the minimum (approx. 5 sec). The sensor is often set to daylight to deactivate the photocell to avoid false switching due to proximity to the lamps.

Note: When initialising the detector into operation or after a power failure, the motion detector will switch on for the duration of the set time-value.

Connections
Connect power supply as indicated in the terminal connection:
Phase = L
Connected phase = L'
Neutral conductor = N

Technical Data

<table>
<thead>
<tr>
<th>Power Supply:</th>
<th>230V (+6%/-10%) 50/60Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maxload:</td>
<td>400W Inductive</td>
</tr>
<tr>
<td>Power consumption:</td>
<td>&lt;1W</td>
</tr>
<tr>
<td>HF transmitter output:</td>
<td>5.8GHz &lt;10mW ISM Band</td>
</tr>
<tr>
<td>Range:</td>
<td>Up to 5m</td>
</tr>
<tr>
<td>Photo electric switch:</td>
<td>2 to 30 lux</td>
</tr>
<tr>
<td>Time setting:</td>
<td>5 sec to 25 min</td>
</tr>
<tr>
<td>Ambient temperature range:</td>
<td>-10 to + 50°C (The luminaire ambient operating temperature may be more restricted)</td>
</tr>
<tr>
<td>Housing material:</td>
<td>UV stable Polycarbonate</td>
</tr>
</tbody>
</table>

Luminaire Range Compatibility
The device is designed for integration into our luminaires and is not available as a stand alone device.

Luminaire ranges particularly suited to the integrated microwave sensor include: Tufflite, Crompack 5, Cercla, Modulay with panels, Varsity and Wavelite 2. The “IM” prefix on compatible luminaires indicates inclusion of the microwave detector. Please contact your local Eaton sales engineer to discuss your requirements.

Trouble Shooting Guide

<table>
<thead>
<tr>
<th>Malfunction Cause Remedy</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The load will not work</td>
<td>Incorrect light-control setting selected</td>
<td>Adjust setting</td>
</tr>
<tr>
<td></td>
<td>Load faulty</td>
<td>Replace load</td>
</tr>
<tr>
<td></td>
<td>Mains switch OFF</td>
<td>Switch ON</td>
</tr>
<tr>
<td>The load is always on</td>
<td>Continuous movement in the detection zone</td>
<td>Check zone setting</td>
</tr>
<tr>
<td>The load is on without any identifiable movement</td>
<td>The sensor is not mounted for reliably detection movement</td>
<td>Securely mount enclosure</td>
</tr>
<tr>
<td></td>
<td>Movement occurred, but not identified by the sensor (movement behind wall, movement of small object in immediate lamp vicinity etc.)</td>
<td>Check zone setting</td>
</tr>
<tr>
<td>The load will not work despite movement</td>
<td>Rapid movements are being suppressed to minimise malfunctioning or the detection radius is too small</td>
<td>Check zone setting</td>
</tr>
</tbody>
</table>

For further information contact our technical support and application department on 01302 303240 or email LightingTechnicalUK@Eaton.com
Energy conservation and the resulting cost savings are key drivers in the increasing demand for lighting controls. This new range of intelligent marshalling boxes and accessories offers a simple and easily configured system with all the components necessary to distribute power, detector inputs and switch commands to the connected luminaires.

The range includes a series of programmable Lighting Control Modules and a choice of PIR and microwave detectors each with photocells for daylight harvesting. Controls enhance any lighting scheme, helping to create a comfortable lit environment as well as optimising energy efficiency.

Lighting controls can provide energy savings in excess of 50%. Where controls are taken into account, they can aid compliance with the energy efficiency requirements of the Building Regulations and energy efficiency incentives such as the Enhanced Capital Allowance scheme.

- Energy saving through occupancy detection and daylight harvesting
- PIR and microwave detector options, all with photocells and absence functionality
- Quick and simple plug and play connection minimising installation time
- 12 luminaire connections, via 6-pole locking connectors, across 6 channels
- The 6 channels can be independently controlled or linked in any configuration
- Compatible with digital DSI or DALI dimming protocol
- Multiple SELV switch and detector inputs
- Commissioning via easy to use PC based software, subsequent operation and parameter changes via infra-red handset
Marshalling Boxes

There are 4 marshalling box variants offering different functionality and compatibility with the range of accessories.

LCMB12W is the switching only variant that offers configurable channel outputs and is ideal for areas where a simple light level offset and time delay provides sufficient control of luminaires.

LCMB12WD is the digital dimming variant, compatible with both DSI and DALI ballasts, this allows daylight harvesting to trigger dimming to regulate the luminaire output relative to the commissioned light level setting.

LCMB12WB has an integrated communication BUS interface to facilitate connection to a BUS loop enabling interaction with a wider lighting control system. (This variant does not have the dimming function) The BUS has mains voltage protection via a replaceable BUS card to prevent damage to the remainder of the box should mains be applied to the BUS loop in error. (The recommended cable for the BUS is 1.5mm² unscreened twisted pair).

LCMB12WDB combines both the dimming functionality and communication BUS interface to produce the most versatile marshalling box option.

If two or more LCMs are to be linked via a BUS loop then a BUS power supply will be needed. For BUS power supply options please refer to page 419.

The marshalling boxes have a modular construction and can be upgraded to add the BUS or Dimming functionality described above if required.

All of the marshalling boxes have the following features:

Construction
Robust VO rated polycarbonate housing finished grey with dedicated mounting points at 240mm centres and numerous cable entry points

Luminaire Connections
12 x 6-pole luminaire connections which are split across 6 different channels as follows:

- 2 channels control 3 luminaire connections each
- 2 channels control 2 luminaire connections each
- 2 channels control 1 luminaire connector each

The maximum recommended load per channel is 6A (with a maximum recommended total load of 16A for the box).

The recommended maximum number of digital dimming ballasts per channel is 8, with a maximum of 20 digital dimming ballasts for the box in total.

Luminaires can be supplied fitted with corresponding 6-pole connectors that will lock to the marshalling box, ensuring positive mechanical connection and prevents accidental disconnection.

Detector Inputs

Each box is fitted with 5 x SELV RJ45 detector input sockets, this allows quick and simple connection of the detectors via RJ45 patch leads (available as separate accessories), minimising install time and removing the chance of incorrect hardwiring. The maximum recommended cable length between a detector and the box is 100m.

Switch Inputs

Each box is fitted with 5 x 3-pole SELV switch input sockets. These connections are a pluggable terminal block with a common and two returns with normally open contacts. The function of each switch input can be attributed to one or more of the luminaire channels. These inputs have the potential to allow up to 10 functions to be attributed to them and could be used to create scene setting functionality.

The recommended cable for use with the SELV switch inputs is 3-core 0.75mm² 300/500V to CMA ref 3183Y (or 3183B for LSZH cable).

The maximum recommended cable length between a switch device and the box is 100m.

Each LCM is supplied with 2 switch input plugs. A pack of 5 is available if more are needed (LCMCP).

Mains supply

The box requires a 230/240V 50Hz electrical supply.

The mains input terminal is 4-pole with cable capacity of 2 x 2.5mm² or 1 x 4.0mm² per termination. The box is supplied with a link between the permanent and switched live terminals, this can be removed where a permanent live supply is to be connected for emergency luminaires.

The permanent live input is common to all channels so a single key switch will drop the permanent supply to all 6 channels.

Dimensions

- Depth 50mm (108mm with 6-pole plug and lead fitted)
- Length 315mm (361mm including fixing feet)
- Width 205mm
- Weight 1.85kg
- Fixing centres 340mm
Sensors

There are 3 different detectors available for direct connection to the marshalling box. Up to five detectors in total can be connected to the box via the RJ45 patch leads, available separately. The maximum recommended patch lead length is 100m. Identify which sensors are to provide the daylight signal on each channel to avoid any conflict of 2 photocells on one channel trying to compete with each other.

Accessories

To complete the Lighting Control Module system there are a number of wiring accessories to make connection and integration quick and easy saving valuable time.

Patch leads to link the sensors to the box are available in 3m and 5m lengths, these are supplied fitted with an RJ45 termination at each end.

Luminaire connection leads can be supplied pre fitted to the majority of the Eaton luminaire ranges, allowing simple out-of-the-box connection of the luminaires directly to the chosen marshalling box. This makes specification of the full lighting system quick and easy. These are available in 6-pole 3m and 6-pole 5m length options using the G63 and G65 luminaire suffix codes respectively. Alternatively the latching connectors can be purchased as separate accessories.

LCM commissioning is via PC based software. Commissioning is a service Eaton offer for the LCM. Please contact us for further details. Subsequent simple parameter changes can then be achieved with the hand held master programmer (LCSQSP). Refer to page 424 and 431 for handset details.

LCMBMS is a corner mount microwave occupancy detector with integrated photocell.

This device is supplied with surface or semi recessing bezels and is designed to sit below the ceiling line and detect occupancy across a room when ideally sited in the opposite corner to the point of entry to the room.

At maximum sensitivity the detection range extends 20m from the flat face of the detector.

This type of detector is ideal in open areas benefitting from its large detection range.

Care should be taken with the fixing and location of the microwave detectors to ensure the detection pattern is not blocked by solid obstructions or may perhaps detect movement in an adjacent room through windows or lightly constructed partitions. Note vibration or moving machinery may also trigger the microwave.

LCMBMF is a 360° ceiling mount microwave occupancy detector with integrated photocell.

This device is designed to be mounted in the plane of the ceiling and has a conical detection pattern vertically below the detector. The detection cone diameter at the floor is 2.8 x the mounting height.

LCMBPIRF is a 360° ceiling mount PIR occupancy detector with integrated photocell.

This device is designed to be mounted in the plane of the ceiling and has a conical detection pattern vertically below the detector. The detection cone diameter at the floor is 2.4 x the mounting height.
Typical Room Configuration

The following example shows a typical classroom scenario, demonstrating the application of the marshalling box and accessories.

9 luminaires are used for the main space with an additional task luminaire over the teaching board.

These luminaires are connected to the following channels on the box to enable the necessary functions to be assigned to those channels:

- Channel 1 has C and F connected
- Channel 2 has H and I connected
- Channel 3 has the teaching board light connected
- Channel 4 has G connected
- Channel 5 has A and D connected
- Channel 6 has B and E connected

3 independent wall switches, each connected to a separate SELV switch input on the box are assigned to the relevant channels on commissioning to operate the following luminaires:

a. The teaching board light
b. Luminaires A, D and G closest to the board, enables them to be switched off for projected presentations etc
   c. Luminaires B, C, E, F, H and I to the rear of the room

A combined PIR with integrated photocell (LCMBPIRF), shown positioned between Luminaires D and E, is connected via a patch lead to one of the RJ45 SELV sensor inputs on the box. All channels are assigned on commissioning to act on occupancy detected by the sensor.

Luminaires G, H and I forming the window row are dimmable and channels 2 and 4 used for these luminaires are assigned on commissioning to act on the photocell for daylight harvesting.

In absence mode the luminaires will not come on until manually switched even if occupancy is detected.

In presence mode all the luminaires will come on as soon as occupancy is detected, with the window row regulating according to the detected natural light.

Luminaires will automatically turn off after the commissioned time delay following the last detected occupancy (default is 20 minutes).

For further information contact our technical support and application department on 01302 303240 or email LightingTechnicalUK@Eaton.com

<table>
<thead>
<tr>
<th>Cat No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCMB12W</td>
<td>LCM 12 way 6 channel Switching only</td>
</tr>
<tr>
<td>LCMB12WD</td>
<td>LCM 12 way 6 channel Digital Dimming</td>
</tr>
<tr>
<td>LCMB12WB</td>
<td>LCM 12 way 6 channel Switching and BUS connection</td>
</tr>
<tr>
<td>LCMB12WDB</td>
<td>LCM 12 way 6 channel Digital Dimming and BUS connection</td>
</tr>
</tbody>
</table>

**Catalogue Numbers**

**Sensors for the LCM**

- LCMBMS: Microwave detector and Photocell surface/semi-recessed mount
- LCMBMF: Microwave detector and Photocell flush mount
- LCMBPIRF: PIR detector and Photocell flush mount

**LCM Accessories**

- LCMPL3RJ45: Patch Lead 3m CAT5 c/w RJ45 connectors
- LCMPL5RJ45: Patch Lead 5m CAT5 c/w RJ45 connectors
- LCM6PGL: 6-Pole Black/Grey GST latching Male connector
- LCMCP: LCM switch input connectors - pack of 5
Ideal for today’s fast paced project requirements, the Connect Wiring System offers a simple to use solution that saves time and cuts the cost of installation, whilst providing future maintenance and flexibility benefits.

Each luminaire specified with the Connect system is fitted with an integral panel mounted socket. A pre-fabricated lead kit, consisting of a T-connector plus 3 or 5 metres of 4 core LSOH cable fitted with a connector at each end, rapidly links standard or emergency converted luminaires together. Future maintenance or reconfiguration is straightforward, with luminaires simply plugged in and out of the circuit. If time and cost is paramount, the Connect Wiring System is an indispensable option.

- Reduced installation time
- Plug and lead kits with T-connector
- LSOH cable as standard
- Safe, self locking connectors
- Suitable for standard and emergency converted luminaires
Materials

- Plug and T-connector - injection moulded thermoplastic material, finish black, with nickel plated brass contacts
- Cable - 4 core, 1.5mm² low smoke zero halogen (LSOH) sheathed, finished white

Installation Notes

- Panel mounted 4 pole male GST plug is fitted to each luminaire specified with Connect Wiring System
- Each luminaire is also fitted internally with a terminal block to facilitate mains power connection for start of run. Alternatively, a lead kit can be used to supply mains power from a proprietary connection box (by others)
- Pre-fabricated lead kits are available with 3m or 5m of cable, with GST 4 pole male and female connector plugs fitted at either end. Kit also contains a GST T-connector with 4 pole male connector input and 2 x 4 pole female connector outputs
- T-connector is plugged into socket on luminaire
- 3m or 5m lead is plugged into T-connector on first luminaire and linked to T-connector on next luminaire, etc
- T-connector and plug have self-latching lock mechanism to prevent accidental disconnection. Requires tool to unlatch
- The final luminaire on the circuit can have the lead plugged directly into the luminaire socket, or a T-connector can be fitted to aid future expansion
- T-connectors, plugs, sockets and cable are rated for a maximum load of 16A
- System components are rated to be plugged in or out under load

Options

- Suitable for use with compatible Eaton’s recessed fluorescent standard mains and emergency converted luminaires, as a standard option
- Connect Wiring for dimming or intelligent lighting systems are available on request. Contact our technical support and application department for details

System Components

- Luminaires
  Compatible recessed fluorescent standard mains and emergency converted luminaires fitted with an integral panel mounted socket. To specify luminaires, add the suffix ‘CX’. A comprehensive list of luminaires suitable for use with the Connect Wiring System can be provided by contacting our technical support and application department
- Plug and Lead Kit
  Interconnecting kit, comprising 3m or 5m x 4 core, 1.5mm² LSOH cable fitted with 2 plugs, plus T-connector

Specification

To specify state: Rapid fit, 4 pole luminaire wiring system, featuring panel mount socket fitted integral to luminaire and interconnecting lead kits, comprising LSOH cable with plug in connectors at each end plus luminaire T-connector for continuous wiring, with self latching lock mechanism, as Eaton’s Connect Wiring System, part no. ________

Catalogue Numbers

<table>
<thead>
<tr>
<th>Description</th>
<th>Cat No</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3m lead with 4 pole plugs and ‘T’ connector</td>
<td>CL43</td>
<td>0.45</td>
</tr>
<tr>
<td>5m lead with 4 pole plugs and ‘T’ connector</td>
<td>CL45</td>
<td>1.15</td>
</tr>
</tbody>
</table>
Why is a driver module required?

An LED (Light Emitting Diode) is a solid state device, or semiconductor, which converts electricity passed through it into visible light. To maintain the light output, colour, efficiency and maximise the life of an LED, three factors must be controlled:

1. The manufacturing process and composition of the LED itself
2. Thermal management of the heat generated by the LED
3. The electrical supply to the LED

The driver is the device used to control the electrical supply to the LED. The majority of luminaires in the Eaton’s LED ranges require an LED driver. Some luminaires are supplied complete with the appropriate driver, whilst others indicate on the product pages if a driver is needed.

Driver Types

There are essentially two basic types of driver, those supplying a constant current and those supplying a constant voltage. These are then subdivided by other capabilities such as dimming or colour changing.

Within the Eaton range there is a wide selection of drivers offering different features and characteristics to provide the right product for the application. There is a choice of constant current or voltage outputs, different levels of ingress protection, dimming methods and colour changing versions as well as different physical sizes.

Constant Current Drivers

The majority of luminaires operate on a constant current, however not all constant current LEDs operate on the same current. It is therefore important to note the recommended current for the luminaire and select the appropriate driver. It is possible to operate luminaires at a lower current than recommended though this will reduce the light output and can affect the efficiency. If the current is too high it may cause premature failure of the LED.

When connecting multiple luminaires to the constant current drivers they must be wired in series.

Constant Voltage Power Supply Units

Some of the LED luminaires require a constant voltage, usually 12V DC or 24V DC. When connecting luminaires to these constant voltage drivers they are wired in parallel.
Driver Selection

Each range has a recommended driver listed against it though some installations may require different characteristics, for example, particular dimensional requirements or capable of operating more than one luminaire.

The following tables list the range of drivers on offer, supported with technical data and a column indicating the number of 1W LEDs they are capable of driving.

This step by step guide will aid selection of the required driver(s).

1. From the information on the product page note the following details:
   - LED type and LED quantity within the luminaire.
   - The recommended drive current or voltage
   - Any dimensional constraints related to the installation, e.g. the cut out aperture of the luminaire.

2. Find the appropriate section of the table for the type of driver required:
   - Constant current - fixed output
   - Constant current - dimmable
   - High ingress protection
   - Colour changing
   - Constant voltage - fixed output
   - Constant voltage - dimmable

3. Look at the input current or voltage column to find those drivers matching that required by the luminaire.

4. Cross check the number of LEDs the driver can operate is sufficient for the product(s)
   - Note some drivers have a minimum load requirement. For example the LS-PD312 needs a minimum of three 1W LEDs to be connected to it for it to operate correctly.

5. Check the driver is dimensionally suited to the application.

6. This process may show several drivers are suitable for the chosen luminaire. Refine the selection by checking the other characteristics such as IP rating or power factor and also refer to the latest price list to compare the cost.

Driver Selection Examples

Example 1

Four fixed colour GR5-3K2-CW45C in-ground luminaires, with all four to be driven by one fixed output driver.
Each luminaire contains three 1W LEDs and requires a 350mA drive current. Assuming the driver is to be mounted indoors remotely from the product with no dimensional or Ingress Protection constraints.

This produces the following selection results:

LS-PD312 will run up to 12 x 1W LEDs at 350mA so will run the four GR5-3K2 luminaires
LS-PBX27 will run up to 27 x 1W LEDs at 350mA (split over 3 channels) so will run up to nine GR5-3K2 luminaires

In this case the LS-PD312 may be the best choice as it is smaller and lower cost than the LS-PBX27.

Example 2

The same GR5-3K2-CW45C as example 1 but with one driver per luminaire with the driver being installed beneath the fitting assuming in an application where IP40 is suitable protection results in the following option:

LS-MN03 will run up to 3 x 1W LEDs at 350mA so will run one GR5-3K2 luminaire and with its small physical size will fit easily through the cut out and sit within the ground sleeve beneath the luminaire.

Eaton’s specialist LED team are able to provide support and assistance with project design and specification. For further details contact our LED technical support and application department on 01302 303240 or to arrange a visit from your local specialist sales engineer, contact our customer care centre on 01302 303303.
### LED Driver Selection Guide

#### Constant Current Non-Dimmable

<table>
<thead>
<tr>
<th>Cat No</th>
<th>1W LED Quantity</th>
<th>Dimensions L x W x H (mm)</th>
<th>Weight (kg)</th>
<th>pf</th>
<th>Drive Current (mA)</th>
<th>Mains Supply voltage</th>
<th>Strain Relief</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-MN01</td>
<td>1</td>
<td>59 x 42 x 20.0</td>
<td>0.03</td>
<td>0.6</td>
<td>IP40</td>
<td>350</td>
<td>190-265</td>
<td>Yes Small size</td>
</tr>
<tr>
<td>LS-MN03</td>
<td>2-3</td>
<td>59 x 42 x 20.0</td>
<td>0.03</td>
<td>0.6</td>
<td>IP40</td>
<td>350</td>
<td>190-265</td>
<td>Yes Small size</td>
</tr>
<tr>
<td>LS-MN04</td>
<td>1</td>
<td>59 x 42 x 20.0</td>
<td>0.03</td>
<td>0.6</td>
<td>IP40</td>
<td>700</td>
<td>190-265</td>
<td>Yes Small size</td>
</tr>
<tr>
<td>LS-MN09</td>
<td>1</td>
<td>59 x 42 x 20.0</td>
<td>0.03</td>
<td>0.6</td>
<td>IP40</td>
<td>900</td>
<td>190-265</td>
<td>Yes Small size</td>
</tr>
<tr>
<td>LS-DPL110</td>
<td>1-9</td>
<td>117 x 50 x 28.0</td>
<td>0.075</td>
<td>0.6</td>
<td>IP40</td>
<td>350</td>
<td>90-250</td>
<td>Yes Loop-in/out</td>
</tr>
<tr>
<td>LS-DPL304</td>
<td>1-4</td>
<td>117 x 50 x 28.0</td>
<td>0.075</td>
<td>0.6</td>
<td>IP40</td>
<td>700</td>
<td>90-250</td>
<td>Yes Loop-in/out</td>
</tr>
<tr>
<td>LS-PD312</td>
<td>3-12</td>
<td>138 x 40 x 28.5</td>
<td>0.11</td>
<td>0.6</td>
<td>IP40</td>
<td>350</td>
<td>190-265</td>
<td>Yes Loop-in/out</td>
</tr>
<tr>
<td>LS-PD309</td>
<td>3-9</td>
<td>138 x 40 x 28.5</td>
<td>0.11</td>
<td>0.6</td>
<td>IP40</td>
<td>700</td>
<td>190-265</td>
<td>Yes Loop-in/out</td>
</tr>
<tr>
<td>LS-PD316</td>
<td>3-9</td>
<td>138 x 40 x 28.5</td>
<td>0.11</td>
<td>0.6</td>
<td>IP40</td>
<td>1000</td>
<td>190-265</td>
<td>Yes Loop-in/out</td>
</tr>
<tr>
<td>LS-PBX27</td>
<td>3-27 (9 per channel)</td>
<td>147 x 75 x 29.0</td>
<td>0.26</td>
<td>0.85</td>
<td>IP40</td>
<td>350</td>
<td>190-265</td>
<td>Yes 3 channel</td>
</tr>
</tbody>
</table>

#### Constant Dimmable

<table>
<thead>
<tr>
<th>Cat No</th>
<th>1W LED Quantity</th>
<th>Dimensions L x W x H (mm)</th>
<th>Weight (kg)</th>
<th>pf</th>
<th>Drive Current (mA)</th>
<th>Mains Supply voltage</th>
<th>Strain Relief</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-DBX27</td>
<td>3-27 (9 per channel)</td>
<td>147 x 75 x 29</td>
<td>0.26</td>
<td>0.85</td>
<td>IP40</td>
<td>350</td>
<td>190-265</td>
<td>Yes 3 channel, retractive switch control</td>
</tr>
<tr>
<td>LS-AD-16</td>
<td>1-16 @ 350mA, 1-8 @ 700mA</td>
<td>110 x 52 x 24</td>
<td>0.105</td>
<td>-</td>
<td>IP40</td>
<td>350/700</td>
<td>230-240</td>
<td>Yes 0-10V dimming</td>
</tr>
<tr>
<td>LS-MD-16</td>
<td>1-9 @ 350mA, 1-4 @ 700mA</td>
<td>99 x 39 x 23.5</td>
<td>0.07</td>
<td>-</td>
<td>IP40</td>
<td>350/700</td>
<td>230-240</td>
<td>Yes Mains dimming (via trailing edge dimmer)</td>
</tr>
<tr>
<td>LED18CC700D</td>
<td>4-12 @ 350mA</td>
<td>153 x 40 x 30.5</td>
<td>0.3</td>
<td>0.9</td>
<td>IP67</td>
<td>350</td>
<td>100-265</td>
<td>-  1-10V dimming Flying Leads</td>
</tr>
<tr>
<td>LED36CC700D</td>
<td>8-24 @ 350mA, 4-12 @ 700mA</td>
<td>153 x 40 x 30.5</td>
<td>0.3</td>
<td>0.9</td>
<td>IP67</td>
<td>700</td>
<td>100-265</td>
<td>-  1-10V dimming Flying Leads</td>
</tr>
</tbody>
</table>

#### IP Rated Constant Current - (Non-Dimming)

<table>
<thead>
<tr>
<th>Cat No</th>
<th>1W LED Quantity</th>
<th>Dimensions L x W x H (mm)</th>
<th>Weight (kg)</th>
<th>pf</th>
<th>Drive Current (mA)</th>
<th>Mains Supply voltage</th>
<th>Strain Relief</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-MPL01P</td>
<td>1</td>
<td>82 x 85 x 22</td>
<td>0.06</td>
<td>0.6</td>
<td>IP67</td>
<td>350</td>
<td>190-265</td>
<td>Yes Small size</td>
</tr>
<tr>
<td>LS-MPL03P</td>
<td>2-3</td>
<td>82 x 85 x 22</td>
<td>0.06</td>
<td>0.6</td>
<td>IP67</td>
<td>350</td>
<td>190-265</td>
<td>Yes Small size</td>
</tr>
<tr>
<td>LED10CC350</td>
<td>1-8</td>
<td>97 x 40 x 23</td>
<td>0.16</td>
<td>&gt;0.9</td>
<td>IP67</td>
<td>350</td>
<td>-</td>
<td>450mm flying leads</td>
</tr>
<tr>
<td>LED18CC350</td>
<td>4-12</td>
<td>153 x 40 x 30.5</td>
<td>0.3</td>
<td>&gt;0.9</td>
<td>IP67</td>
<td>350</td>
<td>-</td>
<td>450mm flying leads</td>
</tr>
<tr>
<td>LS-MPL04P</td>
<td>1</td>
<td>82 x 85 x 22</td>
<td>0.06</td>
<td>0.6</td>
<td>IP67</td>
<td>700</td>
<td>190-265</td>
<td>Yes Small size</td>
</tr>
<tr>
<td>LED18CC700</td>
<td>1-6</td>
<td>153 x 40 x 30.5</td>
<td>0.3</td>
<td>&gt;0.9</td>
<td>IP67</td>
<td>700</td>
<td>-</td>
<td>450mm flying leads</td>
</tr>
<tr>
<td>LED36CC700D</td>
<td>4-12</td>
<td>153 x 40 x 30.5</td>
<td>0.3</td>
<td>&gt;0.9</td>
<td>IP67</td>
<td>700</td>
<td>-</td>
<td>450mm flying leads</td>
</tr>
<tr>
<td>LS-MPL09P</td>
<td>1</td>
<td>82 x 85 x 22</td>
<td>0.06</td>
<td>0.6</td>
<td>IP67</td>
<td>900</td>
<td>190-265</td>
<td>Yes Small size</td>
</tr>
</tbody>
</table>
## LED Driver Selection Guide

### Colour Changing

<table>
<thead>
<tr>
<th>Cat No</th>
<th>Quantity</th>
<th>Dimensions L × W × H (mm)</th>
<th>Weight (kg)</th>
<th>pf</th>
<th>IP Rating</th>
<th>Drive Current (mA)</th>
<th>Mains Supply Voltage</th>
<th>Strain Relief</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-RGB27</td>
<td>3-27 (1 per channel)</td>
<td>147 × 75 × 29</td>
<td>0.26</td>
<td>0.86</td>
<td>IP40</td>
<td>350</td>
<td>190-265</td>
<td>Yes</td>
<td>3 channel, retractive switch control</td>
</tr>
</tbody>
</table>

### Maximum Load Watts

<table>
<thead>
<tr>
<th>Cat No</th>
<th>Watts</th>
<th>Dimensions L × W × H (mm)</th>
<th>Weight (kg)</th>
<th>pf</th>
<th>IP Rating</th>
<th>Drive Voltage (V DC)</th>
<th>Mains Supply Voltage</th>
<th>Strain Relief</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-RGB50</td>
<td>50</td>
<td>147 × 75 × 39</td>
<td>0.29</td>
<td>0.96</td>
<td>IP40</td>
<td>24V DC</td>
<td>190-265</td>
<td>Yes</td>
<td>3 channel, retractive switch control, DMX compatible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cat No</th>
<th>Watts</th>
<th>Dimensions L × W × H (mm)</th>
<th>Weight (kg)</th>
<th>pf</th>
<th>IP Rating</th>
<th>Drive Voltage (V DC)</th>
<th>Mains Supply Voltage</th>
<th>Strain Relief</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-RGB-DMX-LV-MINI</td>
<td>200</td>
<td>125 × 52 × 40</td>
<td>0.3</td>
<td>0.96</td>
<td>IP20</td>
<td>12-24V DC</td>
<td>12-24V DC</td>
<td>-</td>
<td>3 channel, DMX compatible, Requires LS-24V200W PSU</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cat No</th>
<th>Watts</th>
<th>Dimensions L × W × H (mm)</th>
<th>Weight (kg)</th>
<th>pf</th>
<th>IP Rating</th>
<th>Drive Voltage (V DC)</th>
<th>Mains Supply Voltage</th>
<th>Strain Relief</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-RGB24V-350W</td>
<td>350</td>
<td>235 × 145 × 113</td>
<td>1.4</td>
<td>-</td>
<td>IP44</td>
<td>24V DC</td>
<td>230-240</td>
<td>-</td>
<td>3 channel, DMX compatible</td>
</tr>
</tbody>
</table>

### Constant Voltage

<table>
<thead>
<tr>
<th>Cat No</th>
<th>Maximum Load Watts</th>
<th>Dimensions L × W × H (mm)</th>
<th>Weight (kg)</th>
<th>pf</th>
<th>IP Rating</th>
<th>Drive Voltage (V DC)</th>
<th>Mains Supply Voltage</th>
<th>Strain Relief</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-12V20W</td>
<td>20</td>
<td>138 × 40 × 28</td>
<td>0.11</td>
<td>0.6</td>
<td>IP20</td>
<td>12V</td>
<td>190-265</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>LS-12V50W</td>
<td>50</td>
<td>206 × 51 × 36</td>
<td>0.41</td>
<td>0.99</td>
<td>IP20</td>
<td>12V</td>
<td>88-264</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LS-12V100W</td>
<td>100</td>
<td>230 × 65 × 42</td>
<td>0.66</td>
<td>0.93</td>
<td>IP20</td>
<td>12V</td>
<td>85-264</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cat No</th>
<th>Maximum Load Watts</th>
<th>Dimensions L × W × H (mm)</th>
<th>Weight (kg)</th>
<th>pf</th>
<th>IP Rating</th>
<th>Drive Voltage (V DC)</th>
<th>Mains Supply Voltage</th>
<th>Strain Relief</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-24V20W</td>
<td>20</td>
<td>138 × 40 × 28.5</td>
<td>0.11</td>
<td>0.6</td>
<td>IP40</td>
<td>24V</td>
<td>190-265</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>LS-24V60W</td>
<td>60</td>
<td>206 × 51 × 36</td>
<td>0.22</td>
<td>0.96</td>
<td>IP20</td>
<td>24V</td>
<td>190-265</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>LS-24V100W</td>
<td>100</td>
<td>230 × 65 × 42</td>
<td>0.66</td>
<td>0.93</td>
<td>IP20</td>
<td>24V</td>
<td>85-264</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LS-24V150W</td>
<td>150</td>
<td>199 × 99 × 50</td>
<td>0.76</td>
<td>0.93</td>
<td>IP20</td>
<td>24V</td>
<td>85-264</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LS-24V200W</td>
<td>200</td>
<td>199 × 99 × 50</td>
<td>0.85</td>
<td>0.93</td>
<td>IP20</td>
<td>24V</td>
<td>85-264</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LS-24V320W</td>
<td>320</td>
<td>215 × 115 × 50</td>
<td>1.1</td>
<td>0.95</td>
<td>IP20</td>
<td>24V</td>
<td>88-264</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LS-24V600W</td>
<td>600</td>
<td>170 × 120 × 93</td>
<td>1.9</td>
<td>0.95</td>
<td>IP20</td>
<td>24V</td>
<td>88-264</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

1-10V dimmable versions available

For further information contact our technical support and application department on 01302 303240 or email LightingTechnicalUK@Eaton.com
A whole new dimension in lighting is now available with LEDs. The ability to dynamically change colour enables the designer to create effects never seen or experienced before. As the colour is generated at source there is no need for filters which absorb the light. Combining different coloured LEDs provides the ability to generate any colour in the spectrum, both fixed and dynamically changing. The possibilities are endless.

**RGB Luminaires**
A wide range of Eaton’s architectural luminaires integrate red, green and blue LEDs to provide colour change capability.

**Colour Change Driver**
All RGB luminaires are supplied complete with RJ45 plug for simple connection into a colour change driver.

**User Control**
A powerful yet user friendly control unit provides multiple default scenes and shows with the ability to programme bespoke colours and effects.

Eaton’s specialist LED team are able to provide support and assistance with project design and specification. For further details contact our lighting technical support and application department on 01302 303240 or to arrange a visit from your local specialist sales engineer, contact our customer care centre on 01302 303303.
Yas Island Hotel
Abu Dhabi

Yas Island Hotel
Abu Dhabi
Colour Change Drivers

3 Channel Driver

- Drives up to 48 LEDs across 3 independent channels
- Universal Mains input 110V AC - 240V AC
- Dynamic power control and pulse amplitude modulation
- Backlit 16 x 1 LCD display menu system
- 350mA, 500mA and 700mA max. LED forward current per channel
- 8-bit control with 8-bit master channel current resolution
- Wide output DC voltage range (1V to 48V DC)
- DMX-512A protocol support
- Multiple channel bonding to create high current outputs >2.1A
- Real time LED current, voltage and status monitoring
- Linear and smooth dimming selectable on each channel
- As the LED forward voltage demand goes down, the maximum forward current can be pushed up
- Over 81,000 internal programme scene options
- DMX master/slave options

Technical Data

<table>
<thead>
<tr>
<th>Input</th>
<th>110 - 240V AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Frequency</td>
<td>50 - 60Hz</td>
</tr>
<tr>
<td>Consumption</td>
<td>1 - 55W</td>
</tr>
<tr>
<td>Power Factor</td>
<td>0.86/230V AC, 0.9/115V AC @ full load</td>
</tr>
<tr>
<td>Efficiency</td>
<td>&gt;65% at full load input</td>
</tr>
<tr>
<td>Connection</td>
<td>Standard IEC mains filter</td>
</tr>
<tr>
<td>Standby Power</td>
<td>&lt;6W (total)</td>
</tr>
<tr>
<td>Inrush Current</td>
<td>&lt;9A</td>
</tr>
</tbody>
</table>

Output

- Output Power: 1-33W per channel, max 55W
- Output Current: 0 - 500mA @ 48V DC per channel
- 0 - 700mA @ 24V DC per channel
- Voltage Range: 1 - 48V DC per channel
- LED Connection: 8 Pin Molex terminal connector
- Thermistor Connection: Included in the LED connector

Control Input

- Dimming control: DMX-512A or RDM
- Connection: RJ45 Connector
- Dimming Range: 0 - 100%
- DMX Address Range: 001 - 510 via Menu system
- Programs: See user manual for all pre-sets
- Master / Slave Arrangement: See user manual
- Thermal Feedback Control: Thermistor control – 4 options
- Dimming Resolution: 8-bit and Master Dim PAM

Environmental

- Operating Ambient Temperature: -10ºC to + 50ºC
- Storage Ambient Temperature: -20ºC to + 70ºC
- Case Temperature: + 75ºC
- Relative Humidity: 80%

Protection

- Over Voltage, Over Temperature, Overload, Short Circuit, Open Circuit

Catalogue Numbers

<table>
<thead>
<tr>
<th>Cat No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-CLM2-VAR-3</td>
<td>3 channel LED driver</td>
</tr>
</tbody>
</table>
Colour Change Drivers
24 Channel rack mount driver

- 19 inch rack mounted driver system - 1U
- High power density model - 672W output power
- Drives up to 384 LEDs across 24 independent channels
- Universal mains input 110V AC - 240V AC
- Dynamic power control and pulse amplitude modulation
- Backlit 16 x 2 LCD display menu system
- 100mA to 1A LED forward current per channel in 50mA steps
- 8-bit control with 8-bit master channel current resolution to prove up to 4 billion colours in 3 Channels
- Intelligent rack management system for easy rack plug and play system configuration
- DMX or RDM protocol support
- Multiple channel bonding to create high current outputs >6A
- 8 individual temperature measurement sensor inputs for dynamic lighting fixture protection
- Configures as 8 outputs of 3 channels or 6 outputs of 4 channels
- 672W solution can drive up to 1000mA per channel; either 12 channels @ 48V DC or 24 channels @ 24V DC
- Linear and smooth dimming selectable on each channel
- As the DC voltage demand goes down, the maximum forward current can be pushed up
- Real time LED current, voltage and status monitoring
- Over 81,000 internal programme scene options
- DMX Master/slide options
- Takes standard S pin XLR connectors
- Alternatively has an RJ4S connection in the back of the driver

Technical Data

<table>
<thead>
<tr>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting:</td>
</tr>
<tr>
<td>Material:</td>
</tr>
<tr>
<td>Weight:</td>
</tr>
<tr>
<td>Dimensions:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Input</td>
</tr>
<tr>
<td>Input Voltage Range:</td>
</tr>
<tr>
<td>Input Frequency:</td>
</tr>
<tr>
<td>Consumption:</td>
</tr>
<tr>
<td>Power Factor:</td>
</tr>
<tr>
<td>Efficiency:</td>
</tr>
<tr>
<td>Connection:</td>
</tr>
<tr>
<td>Standby Power:</td>
</tr>
<tr>
<td>Inrush Current:</td>
</tr>
<tr>
<td>Output</td>
</tr>
<tr>
<td>Output Power:</td>
</tr>
<tr>
<td>Output Current:</td>
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<tr>
<td>Voltage Range:</td>
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<tr>
<td>LED Connection:</td>
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<td>Thermostat Connection:</td>
</tr>
<tr>
<td>Control Input</td>
</tr>
<tr>
<td>Dimming control:</td>
</tr>
<tr>
<td>Connection:</td>
</tr>
<tr>
<td>Dimming Range:</td>
</tr>
<tr>
<td>DMX Address Range:</td>
</tr>
<tr>
<td>Programs:</td>
</tr>
<tr>
<td>Master / Slave Arrangement:</td>
</tr>
<tr>
<td>Thermal Feedback Control:</td>
</tr>
<tr>
<td>Dimming Resolution:</td>
</tr>
<tr>
<td>Environmental</td>
</tr>
<tr>
<td>Operating Ambient Temperature:</td>
</tr>
<tr>
<td>Storage Ambient Temperature:</td>
</tr>
<tr>
<td>Case Temperature:</td>
</tr>
<tr>
<td>Relative Humidity:</td>
</tr>
<tr>
<td>Protection</td>
</tr>
<tr>
<td>Over voltage, over temperature, overload, short circuit, open circuit, will withstand 300V AC surge input for 5 seconds</td>
</tr>
</tbody>
</table>

Catalogue Numbers

<table>
<thead>
<tr>
<th>Cat No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-CLMX-VAR-24</td>
<td>19&quot; 1U 24 channel rack mount LED driver</td>
</tr>
</tbody>
</table>
User Control

- Stand-alone operation
- Intuitive setup and operation
- Multi-lingual LCD information screen
- Master brightness and speed control
- Smooth digital dimming
- Sound activation for light and sound synchronised effects
- Built-in real-time astronomical clock
- TCP/IP Ethernet connectivity
- Twin full DMX 512 universes
- Range of plate finishes available
- Fits into a standard 47mm UK back box

Technical Data

<table>
<thead>
<tr>
<th>Specification</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply:</td>
<td>15V DC 0.3A, PSU supplied</td>
</tr>
<tr>
<td>DMX Outputs:</td>
<td>2 x 512 channels, fully configurable</td>
</tr>
<tr>
<td>Ethernet:</td>
<td>10/100 on RJ-45 socket</td>
</tr>
<tr>
<td>I/O:</td>
<td>Up to 3 Volt-free contact closure inputs Up to 3 0-10V outputs</td>
</tr>
<tr>
<td>User Interface:</td>
<td>RGB buttons, scroll wheel</td>
</tr>
<tr>
<td>Time Functions:</td>
<td>RTC + Astronomical clock built-in</td>
</tr>
<tr>
<td>LCD display:</td>
<td>128 x 64 pixel mono graphic display, user configurable</td>
</tr>
<tr>
<td>Networking:</td>
<td>Web server built-in, library of telnet commands</td>
</tr>
<tr>
<td>Audio In:</td>
<td>Line-level beat triggering audio input. Note audible converter maybe required, contact technical support for details</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>146 x 87 x 35mm. 47mm deep standard UK twin back-box recommended</td>
</tr>
<tr>
<td>Weight:</td>
<td>0.23kg</td>
</tr>
</tbody>
</table>

Catalogue Numbers

<table>
<thead>
<tr>
<th>Cat No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-CS512-SS</td>
<td>DMX wall mount controller with stainless steel fascia</td>
</tr>
<tr>
<td>LS-CS512-W</td>
<td>DMX wall mount controller with white fascia</td>
</tr>
</tbody>
</table>
It is important to understand that the control gear (drivers) used for LEDs do not have the same characteristics as conventional control gear used with traditional light sources.

The short term inrush current of some modern LED drivers can be significantly higher than that of conventional high frequency control gear. This can cause problems with nuisance tripping within the circuit protection (MCBs) and can damage devices used to control/switch the lighting load. Therefore it is important that the electrical circuit design is appropriate for the luminaires and the circuit has the required electrical protection. This is especially important when looking to replace existing traditional luminaires.

Electrical characteristics vary dependent on the luminaire type and LED driver used. Our recommendations for the selection of the maximum number of luminaires which can be connected to different circuit breaker types are available on request.

It should be noted that although figures are listed for type B and C breakers, we would recommend that C type breakers are used.

With the need for protection against excessive inrush currents to protect against circuit breaker tripping and damage to switching devices, we have taken the proactive step to introduce a new device, the PCL16A inrush peak current limiter.

This device can be easily installed as part of the final distribution components, it is simply connected between the supply circuit breaker and the load (i.e. luminaire circuit). It protects the circuit from inductive and capacitive loads. Rated at 16A for continuous operation, it allows a circuit to be loaded to 16A with inrush surges then managed by the device.

The PCL16A device is available as an individual Din-rail mount component or with up to 3 supplied pre-fitted into a remote enclosure to further simplify installation.
- The peak inrush limiter protects circuits and allows more luminaires to be installed on existing circuit breakers reducing installation costs
- Circuit switching/control devices do not have to be overrated to be able to control the high inrush load
- Simple to install with surface mount screw holes and DIN-rail mounting feature
- Available with up to three units pre-fitted into an enclosure to minimise installation time
- Integrated thermal protection to prevent overheating
- Very low power consumption

**Specification**

<table>
<thead>
<tr>
<th>Device:</th>
<th>Peak / RMS Current Limiter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage:</td>
<td>184-265V AC range, 230V AC continuous</td>
</tr>
<tr>
<td>Current Rating:</td>
<td>16A Continuous</td>
</tr>
<tr>
<td>Capacity Load:</td>
<td>1.500uf (max)</td>
</tr>
<tr>
<td>Frequency:</td>
<td>16.33Hz to 440Hz</td>
</tr>
<tr>
<td>Mounting:</td>
<td>DIN-rail TS35mm EN60715 (TS35/7.5 and TS35/15) or 2 screw holes for surface mounting (do not mount the unit on its side, only with the unit vertical or base down on a horizontal surface)</td>
</tr>
<tr>
<td>Terminals:</td>
<td>Spring Type: 0.5-6mm² / 21-10AWG</td>
</tr>
<tr>
<td>Housing:</td>
<td>ABS UL94V-0, IP20 Rated, with Ventilation Slots</td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>-40°C to +70°C with Integrated Temperature Protection</td>
</tr>
</tbody>
</table>

**Dimensions**

![Dimensions diagram](image)

**Catalogue Numbers**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cat No</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x 16A peak inrush current limiter - unit only</td>
<td>PCL16A</td>
<td>0.12</td>
</tr>
<tr>
<td>1 x 16A peak inrush current limiter - c/w enclosure</td>
<td>PCL16A-ENC1</td>
<td>0.72</td>
</tr>
<tr>
<td>2 x 16A peak inrush current limiter - c/w enclosure</td>
<td>PCL16A-ENC2</td>
<td>0.84</td>
</tr>
<tr>
<td>3 x 16A peak inrush current limiter - c/w enclosure</td>
<td>PCL16A-ENC3</td>
<td>0.96</td>
</tr>
</tbody>
</table>