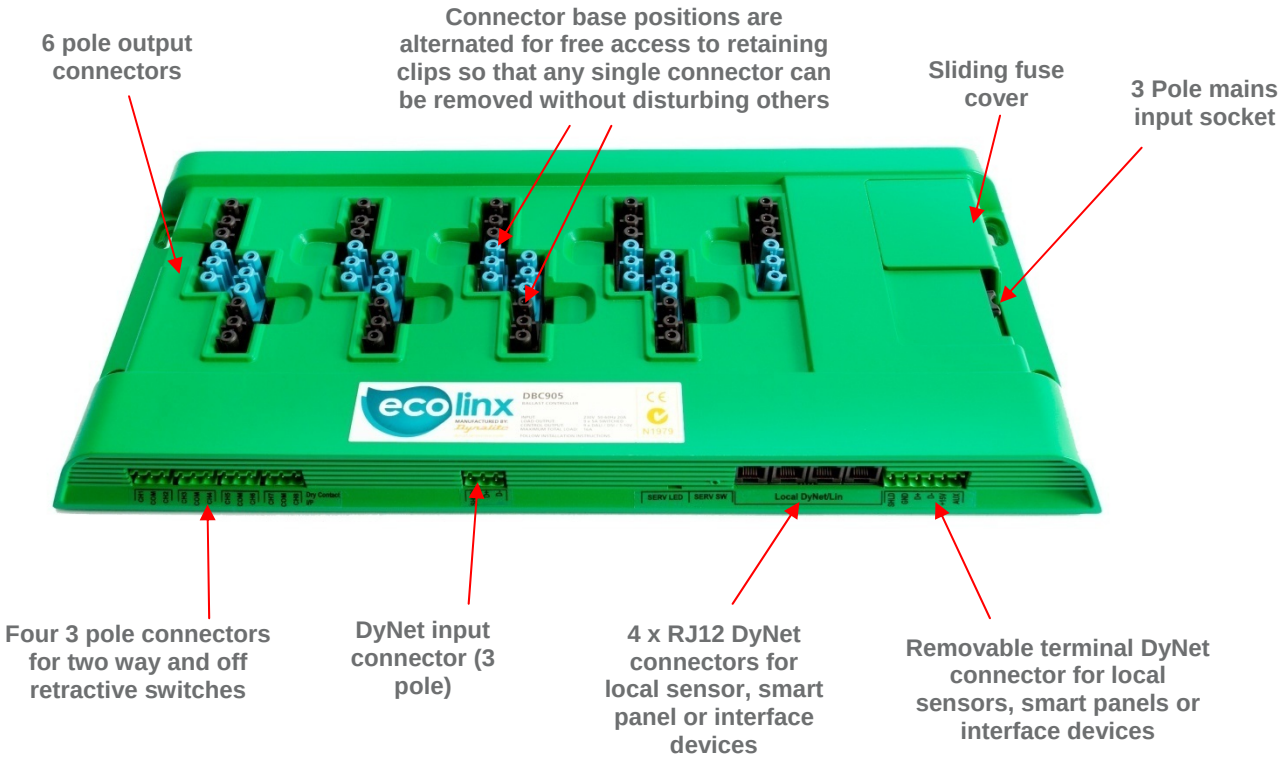
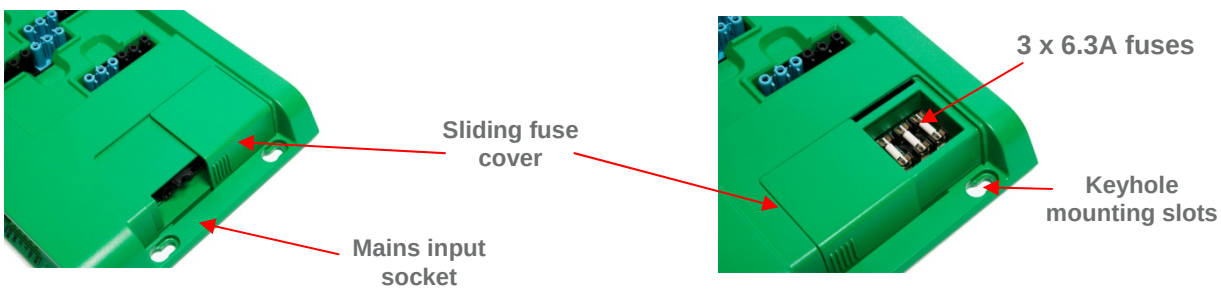
Note: This document relies on the reader having knowledge of Dynalite systems and should be read in conjunction with the latest revision of the DBC905 Data Sheet.

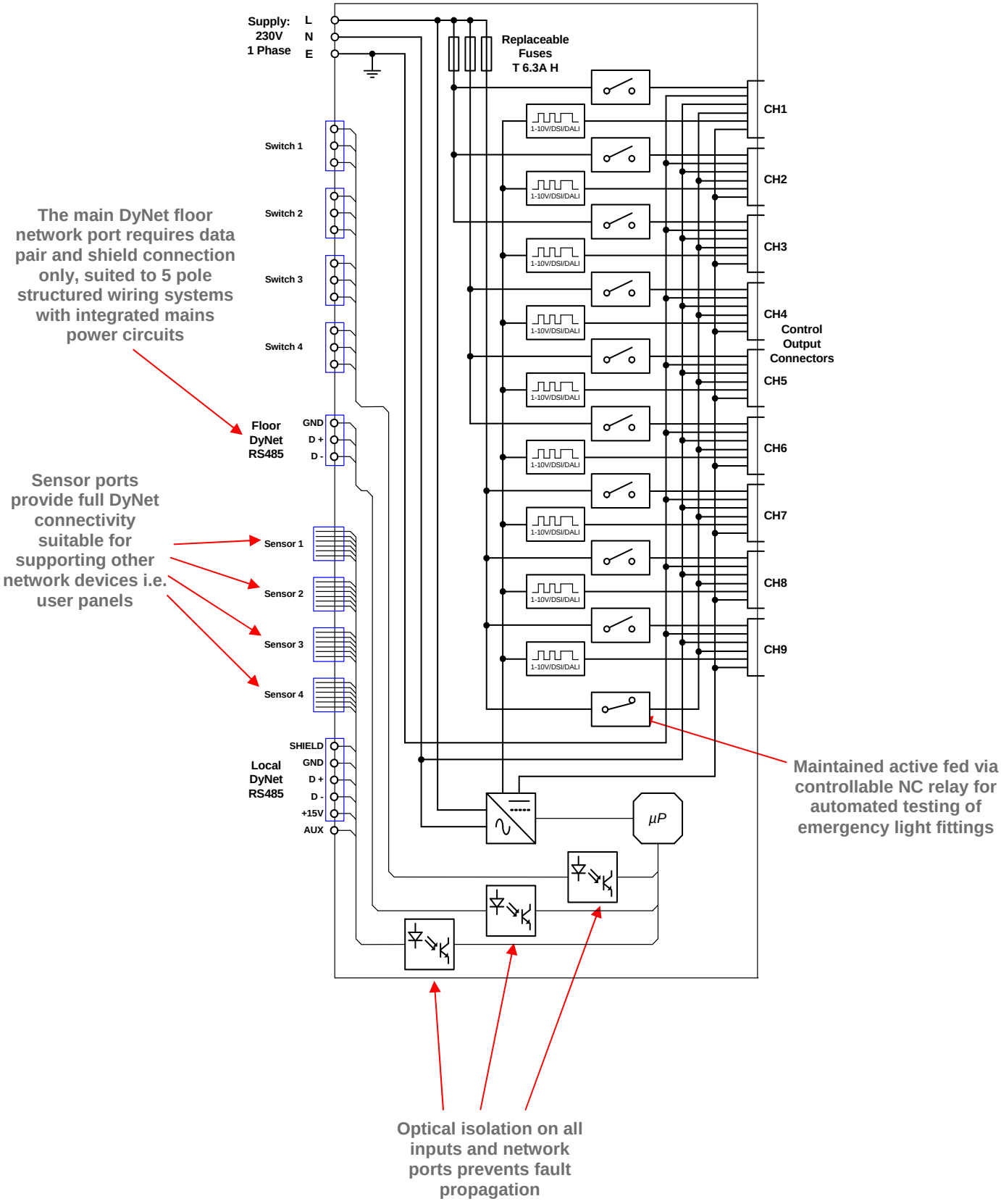
Commercial Outline

The DBC905 high frequency fluorescent ballast controller, which is also known as an LCM (Lighting Control Module), is designed for direct installation within ceiling cavities of commercial office buildings. It is primarily used for energy management and for flexible utilisation of the office space. The LCM outputs are software configurable to support either 1-10V DC, DSI and DALI broadcast protocols. For ease of installation and maintenance the device incorporates structured wiring connectors throughout, which enables the unit to be readily connected or disconnected without the use of tools. The DBC905 is fully scaleable and can be readily integrated with other Dynalite products or interfaced with a Building Management System (BMS), via the DyNet control network, making it ideally suited to small and large commercial office installations where a cost effective lighting management solution is required.



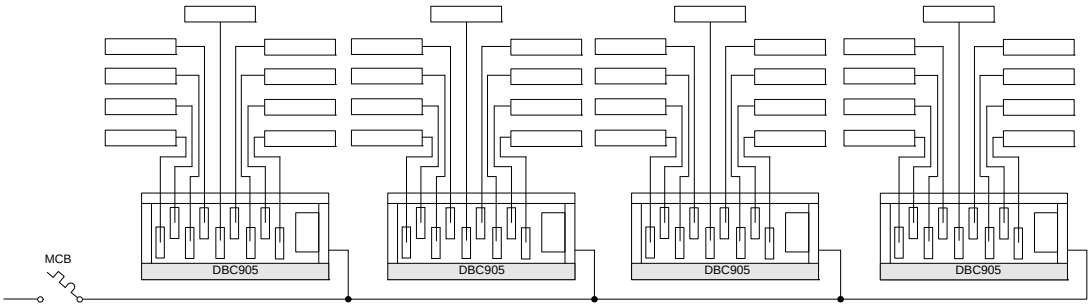


Electrical Diagram

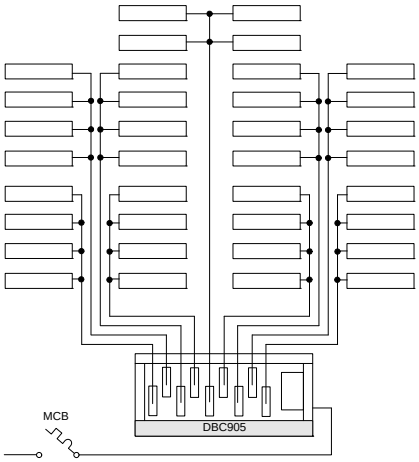


Controller Loading

The DBC905 is available in configurations supporting two popular structured wiring brands; CMS Electracom / Modular Wiring tag series and Wieland GST18 series. Both vendors offer a range of wiring solutions and accessories for both the upstream supply and downstream load wiring. The more popular upstream wiring solutions combine both the mains supply and floor network circuits into one wiring assembly, which can dramatically reduce installation time. The DBC905 controller is suitable for connection to a supply rated and protected up to 20A. This enables more than one controller to be connected to a single lighting circuit. Care should still be exercised when considering circuit loading as lighting fixtures which incorporate electronic ballasts tend to draw high power-up inrush currents. Nuisance tripping of circuit breakers can result if loading is not carefully considered. The DBC905 incorporates a control feature that staggers operation of the power relays by 100mS to minimise potential inrush currents. For a typical C characteristic thermal magnetic circuit breaker, it is recommended that a de-rating factor of 0.6 be applied when calculating total circuit loading. For example, a typical 2 x 28W T5 light fixture operating on 230V nominal supply will draw approximately 0.3A. When fed from a 16A protected lighting circuit, this permits a recommended total load of approximately 32 lighting fixtures (16 x 0.6 / 0.3). If using the DBC905 with a single fixture connected to each output it would be possible to connect 4 controllers to one 16A lighting circuit as illustrated below.



The DBC905 can also support multiple light fixtures connected to a single output to deliver greater economy if required. The most common application of this approach is where all light fixtures in an executive office are connected on one circuit. Care again should be exercised with this approach to not exceed output capacity limitations. It should be noted that each group of three output channels (CH1,2,3, CH4,5,6, CH7,8,9) is protected by a replaceable slow blow 6.3A HRC fuse. As with total circuit loading, a de-rating factor should also be applied to each protected group of outputs if electronic ballasts are used to prevent degradation of the fuses. For the slow blow HRC fuses utilised in the DBC905 a de-rating factor of 0.8 should be used. Using the 2 x 28W T5 example again, this would permit a total of 16 fixtures (6.3 x 0.8 / 0.3) per protected group.



Upstream supply lighting circuits are generally wired with 2.5mm^2 cable as applicable for 16A or 20A loading and protection typical for these types of circuits. One major advantage of including output protection within the DBC905, is that it permits a gauge break in the size of conductors used for the output wiring. This may vary between jurisdictions dependent upon codes and practices; however the integral 6.3A fuse protection generally allows 1.0mm^2 wiring to be used on output circuits. This reduction in output conductor size can significantly reduce the cost of wiring an installation.

DALI Support

The structured wiring controller approach as a lighting management solution for commercial installations also provides a viable alternative to full DALI universe implementations. When installed with a single light fixture loading per output connector, they provide the same level of control granularity as a full DALI implementation i.e. every light fixture can be independently controlled and soft patched into control groups. Furthermore, this principal applies regardless of the ballast control protocol, which enables more cost effective 1-10V or DSI ballasts to be utilised. The challenge with DALI solutions is that specialist knowledge is required when replacing a ballast or light fixture as configuration data is stored within the ballast. When replacing a ballast it is necessary to re-enumerate or pre-configure the DALI ballast so that it operates within the solution as originally intended. The major benefit using structured wiring controllers is that ballasts or complete luminaries can be readily changed without the need for specialist knowledge. The reason for this is that all the logical binding and preset configuration data is managed and stored at the controller level. The life cycle cost of an installation can therefore be reduced considerably as maintenance of failed luminaries can be affected by simply plugging in a replacement light fixture using unskilled or semiskilled labour.

The Ecolinx controller is also hardware equipped for DALI back channel communication. If DALI luminaries are used, this enables diagnostic information to retrieve from the ballasts. It should be noted though that the Ecolinx controller provides broadcast DALI communication only, and it is therefore not practical to obtain diagnostic information if more than one DALI light fixture is connected to a single output.

Connector Layout

Several other structured wiring controller products in the market place today have connectors closely positioned in continuous rows. When arranged this way it is often not practical to access the release clips of each connector when all connectors are fitted. Therefore if it is necessary to replace a single luminare, all preceding connectors on the release clip side must also be removed. The DBC905 controller incorporates a unique layout where each connector position is alternated so that release clips can be readily accessed in each position with all connectors fitted. This can reduce time considerably during installation and maintenance routines.

Safety Isolation

The DBC905 circuit design incorporates multiple layers of isolation to deliver robust fault tolerance and uncompromising safety. The floor network port is isolated to ensure compatibility with upstream/feed structured wiring solutions which typically afford only functional isolation between mains and network circuits. The isolation will tolerate a fault which raises the floor network to mains potential. Note that this does not include mains potential applied across D+ and D- which would of course result in destruction of circuit components. Isolation is also separately provided to the local DyNet ports and switch inputs. This ensures that all switch inputs and local network circuits are SELV and prevents propagation of faults from these circuits across the floor network.

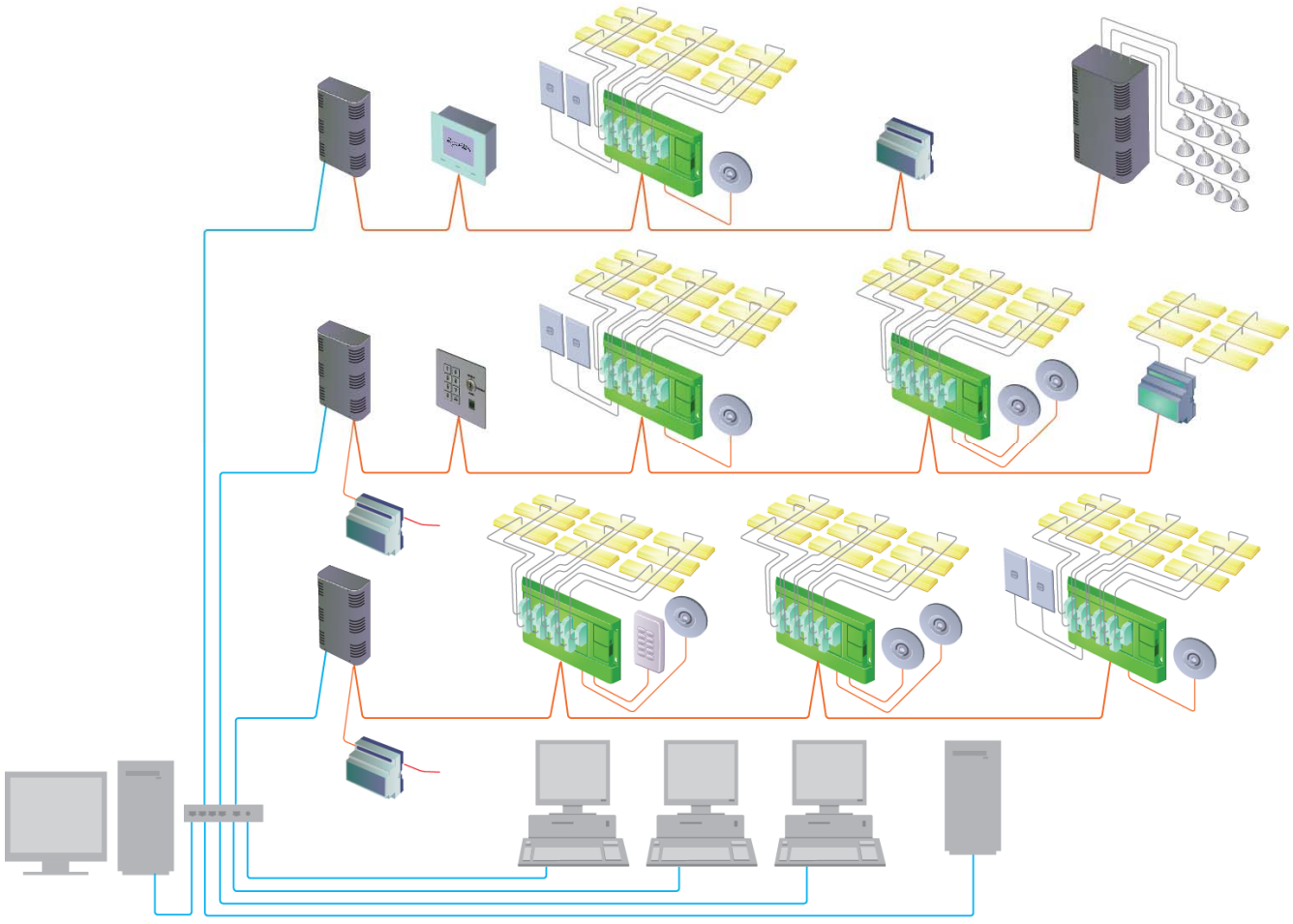
Sales Opportunities

Ecolinx is a new ‘building block’ concept in lighting management systems designed to meet the time and cost saving needs of building developers, designers, owners, occupiers and installers in today’s fast changing environment. From a ‘ready to use’ out of the box solution through to full systems integration, Ecolinx is fully scaleable and upgradeable. You only pay for what you need when you need it.

The DBC905 is the key component in Dynalite’s Ecolinx system, which has been specifically designed for commercial office applications. The core requirements for Ecolinx are to:

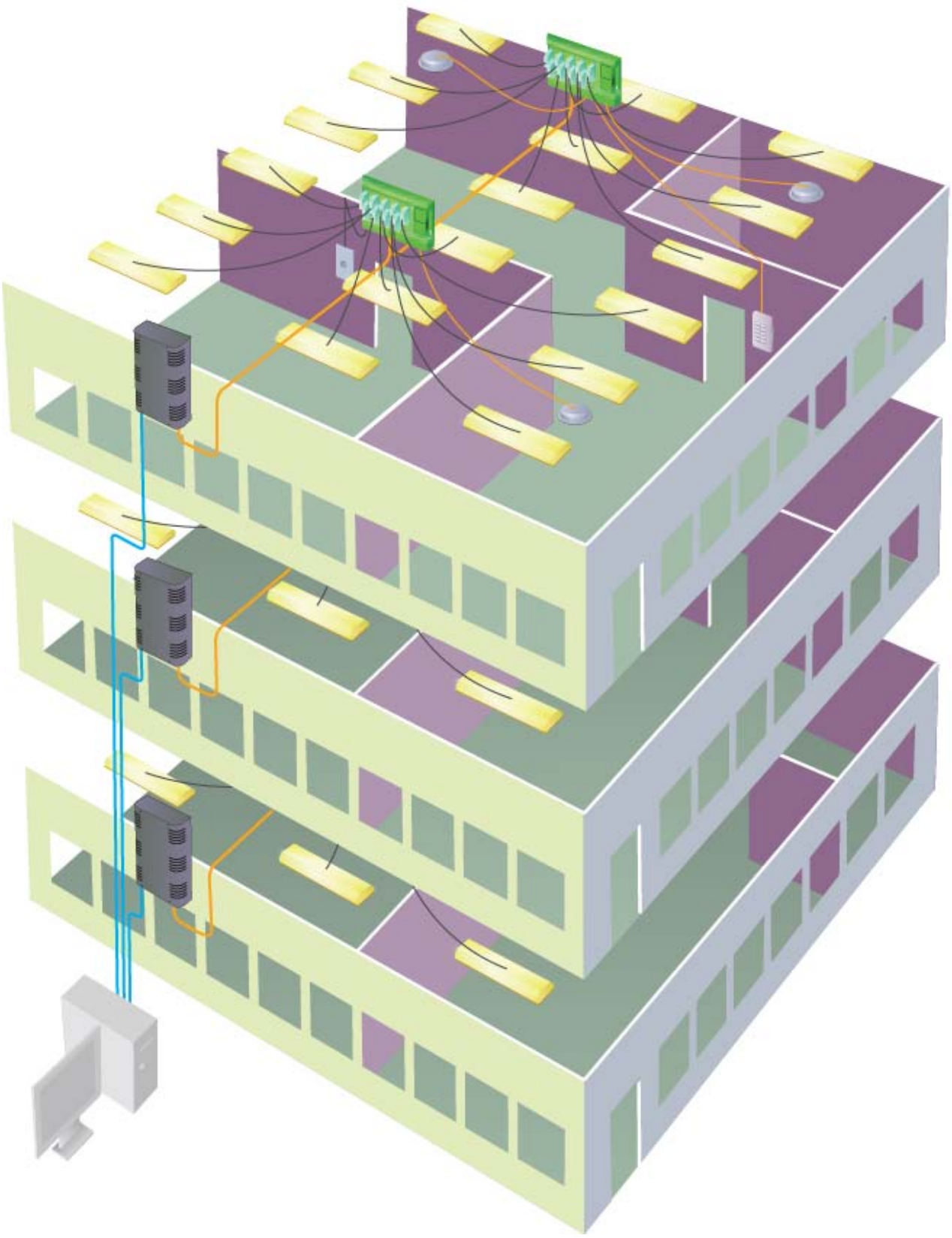
- Cut installation and operational costs
- Introduce flexibility into the use of the office space
- Help the owner to meet legal and building performance regulations

The LCM concept makes major savings possible. Its rapid and straightforward installation, ability to save electricity and automated monitoring can all reduce the total cost of ownership of a lighting system by as much as 50%. Most importantly, a revolutionary approach to low cost system upgrades and configuration changes means that those savings are protected over the life of the building.



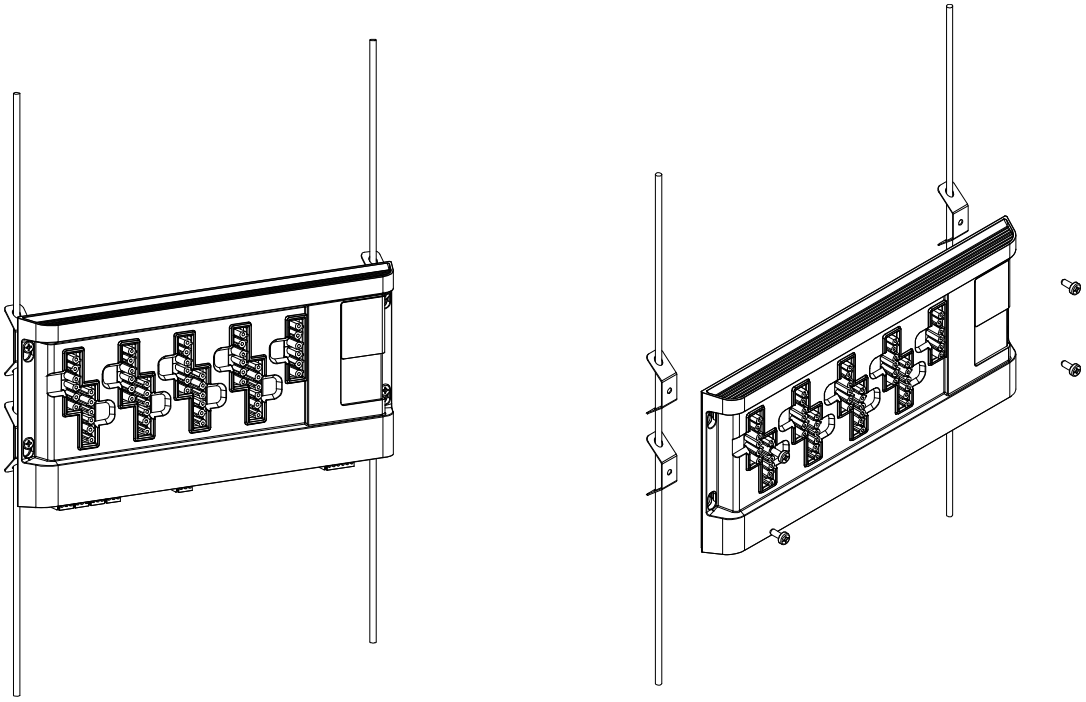
Installation layout

For optimum control flexibility a DBC905 controller is installed for every group of nine lighting fixtures as illustrated below.



Recommended Mounting Method

The LCM has two keyhole slots located at each end of the housing. The mounting options are extremely versatile and can be installed in a number of different ways including vertical or horizontal wall, slab, cable tray or “drop rod” mounting. The recommended method is shown below using “drop rods”.



Wiring Termination

Connectors are utilised for all wiring terminations to simplify maintenance, installation and replacement.

Note

Please note that the DBC905 is **'NOT'** supplied with any connectors, as it is primarily intended for use with structured wiring solutions supplied by either Wieland or CMS Electracom/Modular Wiring. Sales personnel who are in involved in promoting the DBC905 should familiarise themselves with these wiring solutions, to appreciate the full scope of benefits the approach provides.

It should also be noted that most structured wiring solutions for upstream supply circuitry which include both network and power (i.e. 5 pole systems) only provide functional isolation between the data and mains circuits. Where such wiring systems are used, the floor network must be considered at mains potential not SELV, and all floor network wiring should include the appropriate provision for prevention of access to live parts. The main DyNet floor network port on the DBC905 is optically isolated from the dry contact inputs and local DyNet ports for this reason. Particular care should also be made when terminating network spur wiring at floor bridges (area controllers), to again prevent access to parts and wiring considered potentially live. Under these circumstances only DBC905 controllers should be connected to the floor network as they incorporate an isolated port. Under no circumstances should a standard user interface be connected directly to the floor network as this may permit user access to potentially live parts. All user interfaces such as sensors and panels should be connected to the local port on the DBC905 which provides SELV isolation from mains and the floor network. Where it is necessary to connect user interfaces to a floor network of this type, a bridge should be always used to provide effective isolation.

Additional Background Support Information

For many years in Europe, Structured Wiring has been at forefront of European Commercial wiring standards and hence the need for lighting controls to evolute towards a system that accommodates such a wiring configuration.

The launch of ECOLINX has been developed to meet this requirement. To make it clear, Lighting Control Modules (LCM) for structured wiring is not an entirely new development in Europe, in particular the UK. You only have to see the number of competitors that exist.

Firstly what do we need from today's Lighting and Energy Management systems?

1. Flexibility - cope and adapt with the occupancy change, e.g., staff churn.
2. Minimise use of available resource - enable a quick and efficient installation with reduced need for qualified trade staff to install.
3. Increased energy savings – obviously critical for today's climate change driven environment.
4. Legal requirements – enable the building owner to ensure compliance to a range of modern day Environmental and Safety driven building performance regulations.
5. User comfort – meet ongoing expectations of individual user comfort control and performance.
6. Future proof – adaptable and modular to adapt to future requirements in relation to future change in occupancy, building design, regulations and additional services without requiring intrusive renovation.
7. Single operation – work and control the system from one network point.

Concept of Structured / Modular Wiring

It is interesting to note that structured wiring is also referred to within the home automation market, but for a different reason. In residential applications it provides a non-powered cable that services smart home requirements such audio/video/network applications. Common examples of such wiring include Cat 5/Cat 6.

However as far as Ecolinx is concerned our reference is focused on the Commercial adapted variety that in fact comprises of a mains powered cable solution combined with network data cable facilitation for use in applications such as lighting control and office workstation cabling. More often referred to as Modular Wiring, meaning that it is simply modular in approach with its plug 'n play type installation and topology combined with its ability to be upgraded at a later time to accommodate for occupant floor fit outs or re-configuration of the occupied space. No re-wiring has to be done, simply additional cables are installed tool free and connected or in some disconnected from the ceiling grid in order to accommodate for the revised lighting layout.

"Modular wiring is often promoted as requiring minimal trade qualified labour required to be installed".

It would be prudent here to promote Modular Wiring and the Ecolinx system as one that provides a tool free install, enabling an extremely low risk, virtual error free, quick and easy installation that eliminates the need to provide a concentrated amount of Trade labour to install. In other words we would recommend installation under Trade qualified supervision as it would have to be signed off accordingly, but can "free up" trade qualified labour to attend other more technically demanding installation requirements. Time and cost pressures on Electrical Contracting firms are constant and often there is need to complete tail end fit outs in record time, more often due to circumstances beyond the contractor's control, yet the expectation to complete on time and on budget is there regardless. Ecolinx in conjunction with modular wiring meets that market demand.

Industry sales support notes

In regard to the sales process, it is important to note that we are in the business of selling lighting control modules and not modular cabling. Therefore while we will promote and inform the market of modular wiring solutions as part of our Ecolinx sales strategy, and even assist on quote support at the sales face; Dynalite will not supply the cable to market. Instead we ask that a quote can be obtained from the modular cable supplier (Wieland/CMS) and passed directly onto the purchasing party (Electrical Contractor). The purchasing party can then directly liaise with the cable manufacturer accordingly, covering quote acceptance, negotiation, through to invoice.

Modular cabling does require the detailed calculation and co-ordination of specific cable runs, type and project management, including luminaire fixing detail. Both Wieland and CMS are specifically set up to deal with this product category demand.

Why have a LCM system based on Structured / Modular Wiring Solutions?

For a number of years in the UK and throughout some parts of Europe, Structured cabling has been the preferred choice for cabling lighting, network and general electrical services for the commercial office. Taken from the proven method of using structured cabling in the workstation environment where individual workstations can be reconfigured to cope with staff change and churn by adopting a structured/modular wiring "plug and play" methodology.

Now we have a complete plug and play solution in the ceiling. A system that previously was not possible without total rewiring and reconfiguration of the ceiling space which resulted in a lot of waste being generated and not an ideal LCA (Life Cycle Assessment) solution for today's market demands!

Now we have a LCM (Lighting Control Module) in ECOLINX that hands back modular lighting and climate control to the building end user and occupant.

Ecolinx

It is also important to remember that Ecolinx is not just the DBC905, but it's a complete Energy Management lighting control solution equipped with:

- DBC905 LCM – LCM HF ballast controller for modular/structured wiring topology.
- DUS804C PIR/PE Multifunction sensor detecting changes in movement and daylight factors along with the added benefit of remote control.
- DAC 100BT Floor Controller – European network floor controller that enables a building control interface via TCP/IP protocol.
- DNG 100BT 10/100Base T Ethernet Interface – As above, but for Australian requirements.
- DRP Revolution Series of wall panels.
- DTP160 Revolution Touch Screen for easy end user control.
- DLight III Server with DLight III Mapview – Site Management Software.

When presenting Ecolinx, the entire suite of products should be profiled to provide the complete story in regard to Dynalite offering of a complete energy management lighting control solution.

Selected Key Benefits in Detail

- One LCM does it all.....No need to predetermine your lighting and luminaire selection and to determine what LCM type you need from Dynalite; whether you go with 1-10V, DSI or DALI, one DBC905 will control all three, even in the one installation.

- Add the DAC100BT floor controller and you have complete TCP/IP connectivity enabling utilisation of the BMS site network.

- Staff change, churn, floor reconfiguration, tenancy change.....Simply upgrade to suit the new changes without expensive rewiring and reconfiguration of the ceiling space. A building Facility Manager can easily arrange for re-zoning without the need to go through an exhaustive re-commissioning process.

- DALI presents a wonderful Energy Management lighting control solution with individual addressability, but it does require a highly competent installation skill set for commissioning and configuration. Using the DBC905 in a Soft Wiring format in conjunction with DLight III MapView, delivers all the benefits of DALI without the detailed and costly installation/commissioning requirements.

- There is a point to note that DALI is not always perfect and does not always guarantee a perfect streamline installation. There is the occasional DALI failure which can result in costly and complicated enumeration replacement. Not a Facility Manager's dream maintenance task. Using the DBC905 technology, enables you to simply remove the faulty DALI unit/luminaire and replace it by simply "unplugging" the old and plugging in the new. Job done.

- Using DLight III MapView software in conjunction with Ecolinx empowers the building operator not only to monitor lamp and ballast performance, but also group luminaries into required zones to suit and then individually address each luminaire for specific area functionality. Example corridors or celled offices.

- Efficient energy management for the building requires effective real time control at the building envelope. Ecolinx in conjunction with our range of modular controllers and interfaces enables the building occupant to control shading systems and HVAC utilities at the push of a button.

- On site pressures along with the added requirements of increased modern day technology demands of network circuits and the like can lead to installation error when it comes to dimming and switching circuitry. Structured wiring combined with an LCM dictates the need to have all luminaries factory fitted with 5 pole connectors meaning that factory pre-wired and fully tested.

Feature & Benefit Analysis

feature	benefit
Slim line low profile unit at 35mm	Fit into small ceiling voids.
Versatile single-fix mounting that covers vertical or horizontal wall, slab, cable tray or “drop rod” mounting.	Enables ease of installation and able to fit into a variety of ceiling cavities.
Full structured wiring on all inputs and outputs.	Enables tool free installation and reduced need for qualified trades and provides a quick, virtually error free installation.
Modular wiring mains/data connection option.	Enables tool free installation, and easy to replace/maintain luminaries wiring. Maximise LCA cost effectiveness.
Scalable from a single room through to a multi-story office building.	Modular approach ensures Ecolinx can be scaled up anytime from initial tenant requirement to base build concept. Cope with modern day demands of Eco-friendly driven interiors.
Nine 5A outputs with a total load of 16A, utilising Wieland GST18 or CMS plug in connectors.	Set for structural wiring and tool free “plug and play installation”.
3 x 6.3A replaceable HRC fuse links protecting three outputs each.	No need for large 2.5mm plus cables which means a cost saving on installs and cable hardware.
Tenth relay for emergency maintained live testing. Test can be initiated by switch or software.	Becomes the complete LCM and covering Emergency testing and logging. Therefore assist in compliance testing for Building Authority requirements.
Control outputs are software configurable to support either 1-10V DC, DSI and DALI broadcast protocols.	Full versatility to accommodate all three load types that enables you either the ability to switch, dim or in the case of DALI utilise its protocol features. In addition in times where there is supply issues with say DALI, (not uncommon) and DSI is used as an alternative, then no problem. DBC905 will perform all the benefits of DALI as long as the layout is done in Soft Wiring format.
DALI feedback for lamp, ballast status and emergency testing/logging.	Uses all the advantages of DALI in one unit and ensures LCA (Life Cycle Assessment) benefits are maximised.
Out of the box functionality allowing sensors and switches to control local outputs.	Complete unit, able to utilise energy management benefits of Daylight Harvesting and Occupancy control.
4 X RJ12 connections for local sensors/network devices, 5 per unit.	Quick and easy tool free and unqualified trade installation.
4 X inputs for 2 way on and off retractive switches providing simple local switching and up/down dimming Line, Star, spur topology permitted.	Covers most lighting control network industry requirements, along with local control and energy management solutions.
Suitable for use on a DyNet 2 installation which can support up to 65,535 x DBC905s	Enforces the scalable concept to cover whole building lighting control requirements.

170 Scene memory	Provides abundant architectural and energy management lighting control solutions.
Integral DyNet network power supply	Not dependant on potential failure of third party devices.
Full structured wiring	Reduces need for wiring skills on site, tool free connection, and reduced maintenance time when unit needs to be replaced.
Extensive range of Dynalite products	Allows it to be suitable for a variety of LCM requirements, including for scalability for Energy Management, Architectural and AV.
Quick fit “Plug and Play” connectors	Provide incredible reliability as they are factory tested & enabled for quick fit install as against wire termination.
One way plug in slots	Provides error free installation as electrician cannot get the terminations wrong as they only plug in one way.
Light fittings supplied with factory fitted connector leads.	No second guess for trades, no crimped installation on signal cable, just connect and go. Adds to error free install.
6 pole connection facility – Active, Neutral and Earth, Data (D+, D-) and Emergency maintained feed.	Enables mains power and diming within one supply, plus with the additional maintained active (6 poles, 6 core only) remote testing of emergency luminaries to comply with local building regulation requirements.
Modular reconfiguration	If the lighting layout/grid changes, just unplug or re-plug luminaire inputs accordingly. Easy fix to cope with office plan reconfiguration.
Go from switching to dimmable	Enhances base building capability for changes in Tenancy lighting design requirements.
Granularity	Enabling each luminaire can be individually set to balance the artificial light levels and provides a possible cost effective option to DALI. Enhances key Energy Management strategies such as Daylight harvesting when installed as part of a soft wiring layout.
Ceiling cavity installation frees up DB space.	Accommodates increasing need to overcome spacial challenges in the DB unit as it competes with other building operational fixtures. Easier to add controllers/general accessories in the ceiling space than to do so via an overcrowded DB.
Ceiling make up	Clear indication of LCM positioning by the ability to nominate exact station in the “As Builds” and provides flexibility to install these in areas that are easier to access later.
Overcomes DALI complications in address processing. Overcome DALI bingo.	Using DALI broadcast in DBC905 under soft wiring means that you don’t have to address and locate each DALI unit individually.

Key features of the DBC905 include

- Low profile unit (35mm) allowing installation into small ceiling voids
- Versatile single-fix mounting including vertical or horizontal wall, slab, cable tray or “drop rod” mounting
- Full structured wiring on all inputs and outputs negating the need for connection/disconnection tools
- Modular Wiring mains/data connection option
- Scalable from a single room through to a multi-story office building
- Nine 5A outputs with a total box load of 16A, utilising Wieland GST18 connectors
- 3 x 6,3A fuses protecting three outputs each
- Tenth relay for emergency maintained live testing. Tests can be initiated by switch or software
- Control outputs are software configurable to support either 1-10V DC, DSI and DALI broadcast protocols
- DALI feedback for lamp, ballast status and emergency testing/logging
- Out of the box functionality allowing sensors and switches to control local outputs
- 4 x RJ12 connections for local sensors/network devices, 5 per input
- 4 x inputs for 2 way and off retractive switches providing simple local switching and up/down dimming Line, star, spur topology permitted
- Suitable for use on a DyNet 2 installation which can support up to 65,535 x DBC905s
- 170 Scene memory
- Integral DyNet network power supply
- Programmable AUX dry contact input

Key Features and Benefits

feature	benefit
One unit supports 1-10v, DSI & DALI	Lighting loads do not need to be known until commissioning. Reduces the number of LCMs required which saves money, time and mistakes by the consultant or contractor on site.
Full structured wiring	Reduces the need for wiring skills on site as no special tools are required for actual connection. Also maintenance time is reduced if unit needs to be replaced.
Small width and depth of 189 x 35mm	Will fit into the smallest of ceiling voids.
RJ12 network sockets	Reduces the need for wiring skills on site and therefore mistakes as no special tools are required for actual connection. Also maintenance time is reduced if unit needs to be replaced.
3 x 6.3A Fuse protection	As circuit protection is provided within the LCM, the outgoing cables to the luminaires do not need to be so large (cross section) thus saving on cable weight and cost.
Extensive range of Dynalite products	The LCM can be utilised with any of the Dynalite product range allowing a single, scalable network for both energy management, architectural and AV control.
DALI feedback	Although the LCM uses DALI broadcast it is still possible to have limited feedback from the DALI ballast or emergency inverter. This feedback can then be displayed on the MapView GUI.

dynalite

Competitor Comparison Chart

Manufacturer	Dynalite	Simmtronic	Philips	CP Electronics	Delmatic	Apex
Name/Model	Ecolinx/ DBC905W	Spec SPV91 or 92	LMM/ LRC5924	Rapid/ EBR-LCM10-10	Metro One Ten	Spectrum
Size	416x189x35mm	498x170x77	263x175x52mm	332x197x60mm	?	358x320x61mm
Weight	2 kg	2.5kg	1kg	?	?	4kg
Construction	Moulded ABS /single fix	Metal / One piece	Polycarbonate /single fix	Metal /Two piece	Single or Two fix	Metal/ Single/Dual
Fixing method	4 keyhole slots	slots	6 slots	4 keyhole slots	slots?	4 keyhole slots
No of Outputs	9	9	9	10	10	9
Load ch/total	5A/16A	4A/16A	5A/16A	6A/10A?	?A/10A	4A/16A
Circuit protection	3 x 6.3A fuses	6.3A(T)	3 x fuses	Fuses	1 x 10A fuse	?
Output connector	Wieland GST18	Ensto NGC6133	Wieland GST18i4 + BST14i2	Wieland	?	Wieland GST18
Relay only version	× (on request?)	✓ SPV91/92S	✓ LRC5913	✓	✓ No “capsule”	?
One unit for 1-10,DSI,DALI	✓	× 3 separate units	× 1-10v / DALI+DSI	× 1-10v / DALI+DSI	× Requires dim “capsule”	× 1-10v+DSI / DALI
DALI feedback	✓	✓	?	✓	?	?
Mains in connection	Wieland plug GST18i3 (ordered separately)	Hardwired thru 20mm knockout	Wieland plug GST18i3 (supplied)	Hard wired	Plug	Hard wired
Structured wiring compatible	✓ Modular Wiring & Wieland	✓ On request	✓ Modular Wiring & Wieland	✓ Type not specified	?	✓ On request
No. sensor inputs/type	4 x RJ12	Separate E bus for sensors-max 64 on AC	4 x RJ12	2 x RJ45	4	4
Type of sensors	PIR/LS/IR	PIR/LS/IR	PIR/LS/IR	PIR/LS	PIR/LS/IR	PIR/LS/IR
No. per input	5	10 on E bus	5	?	?	?
No. switch. inputs	4	4	4	2	4	0 -Included in 4 sensor inputs
Switch type	2 way & off retractive	?	2 way & off retractive	?	2 way & off retractive	2 way & off retractive
Connector type	3 pole Wieland or Pheonix	?	3 pole Wieland or Pheonix	?	?	4 pole Klippon plug
Bus Network	RS485 DyNet	M bus?	LON	CAN	LON	?
Topology	Line, star, spur	Line, star, spur	Free	Line		?
Polarity free	×	?	✓	?		?
Bus Connector type	3 pole Wieland or Pheonix? (ordered separately)	?	3 pole Wieland or Pheonix (supplied)	?	Plug	?
Em test relay	✓	✓	✓	✓	✓	✓
Em testing	✓	✓	✓	✓	✓	✓
Project price	£150	£160	£160	£150	?	?