



**connected** lighting management  
**technical guide**

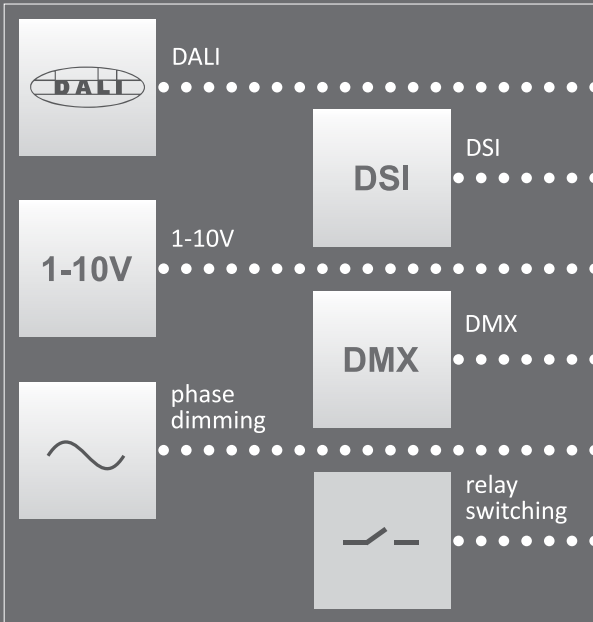
edition 14

**delmatic**

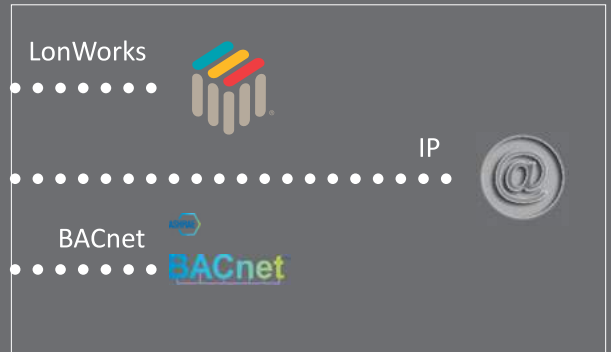
# connected, informed, responsive

Delmatic connected lighting management systems comprise a network of modules using open protocols, providing sustainable, intelligent control, connected to other building systems with a range of local user controls.

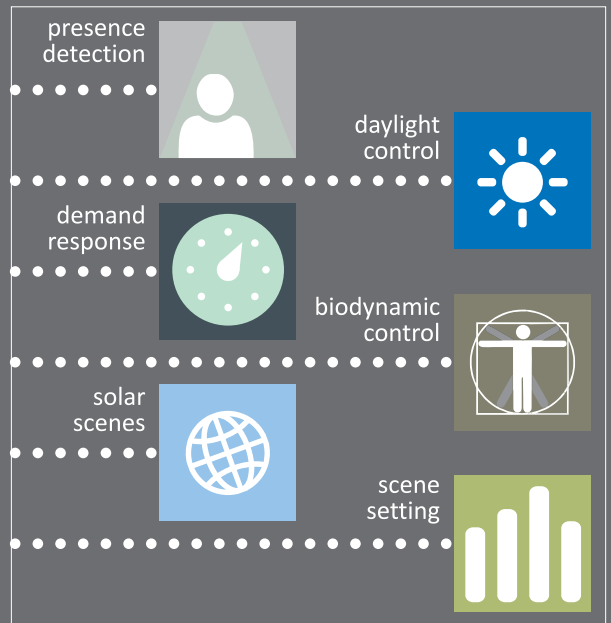
## a network of control modules



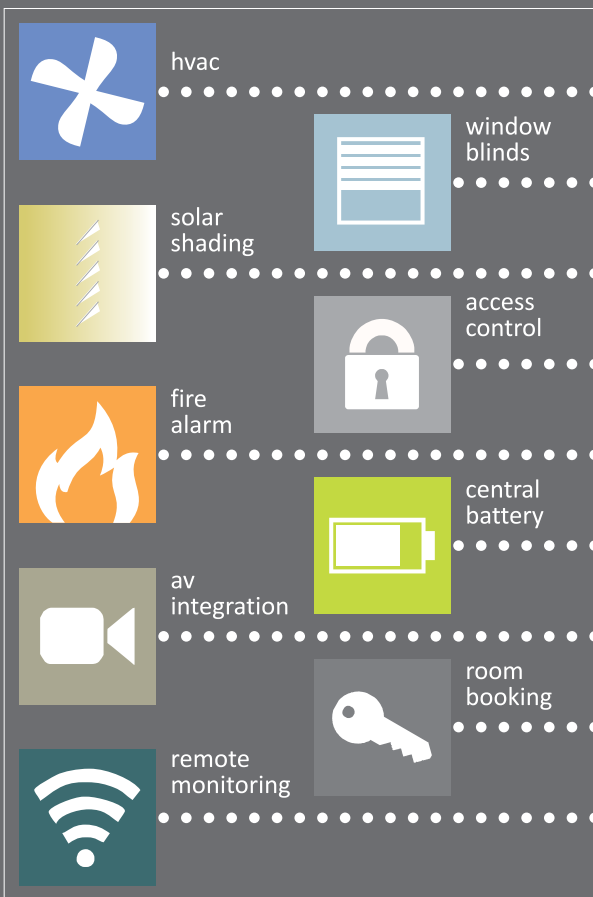
## using international open protocols



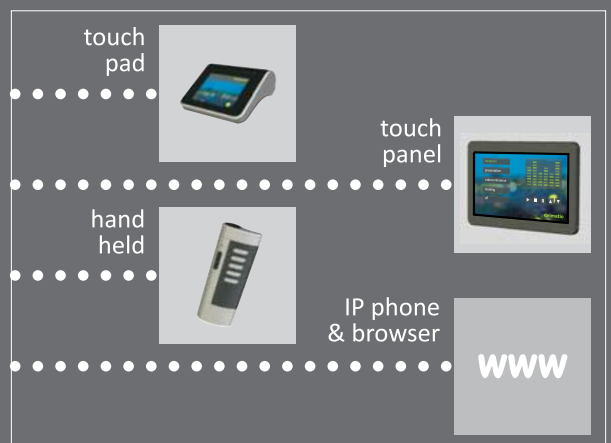
## for sustainable intelligent control



## connect to other building systems



## with a range of local user controls



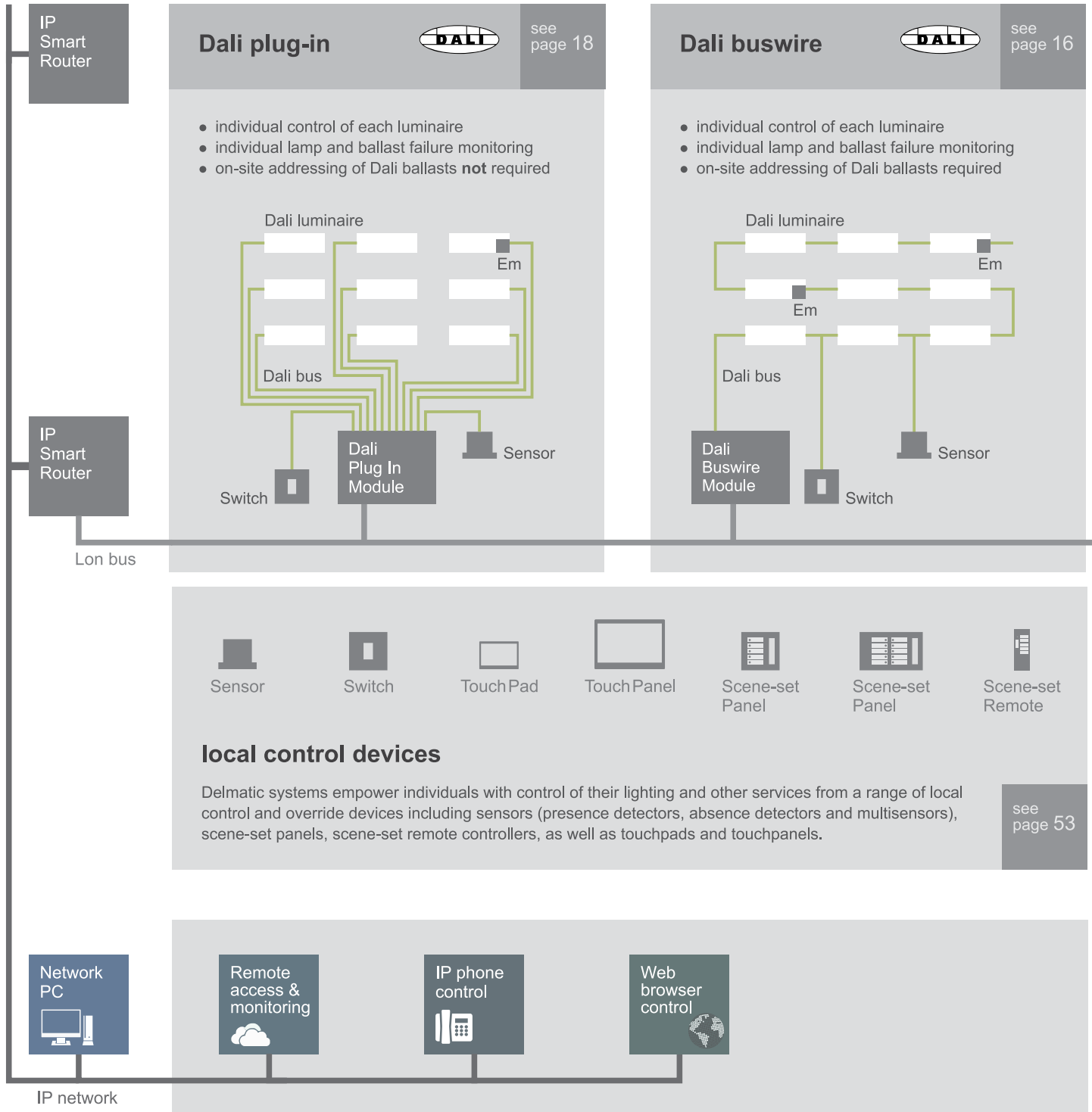
Delmatic connected lighting management systems transform rigid, physical installations into virtual open networks, configured, managed and monitored through powerful graphical software.

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# open system architecture

A typical lighting management system comprises a network PC, smart routers, lighting control modules, sensors and switches.

There are four main types of control module - Dali plug-in, Dali Buswire, Dali Broadcast and Circuit Switching - which simply slot into the lighting management network.

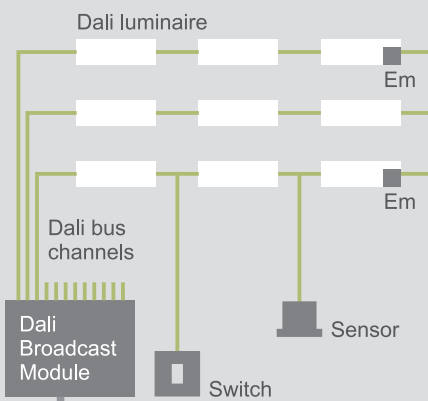


### Dali broadcast



see page 20

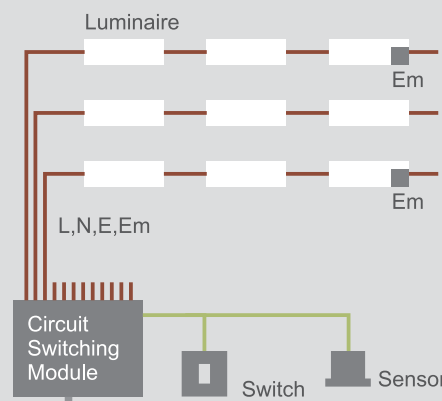
- broadcast control of Dali channels
- lamp and ballast failure monitoring per channel
- on-site addressing of Dali ballasts **not** required



### Circuit switching

see page 42 and 44

- switching control of hard-wired luminaire groups



Lon HVAC Controller

Lon Blind Controller

Lon Access Controller

Lon Fire Controller

### open systems integration

Delmatic systems use open protocol technologies such as Lon & BACnet for seamless integration with other building services including window blinds, HVAC, access control and fire alarm systems. Integration achieves increased energy efficiency, additional operational savings, and enhanced user comfort.

see page 6



**Open, interoperable products and systems are at the heart of today's networked world.**

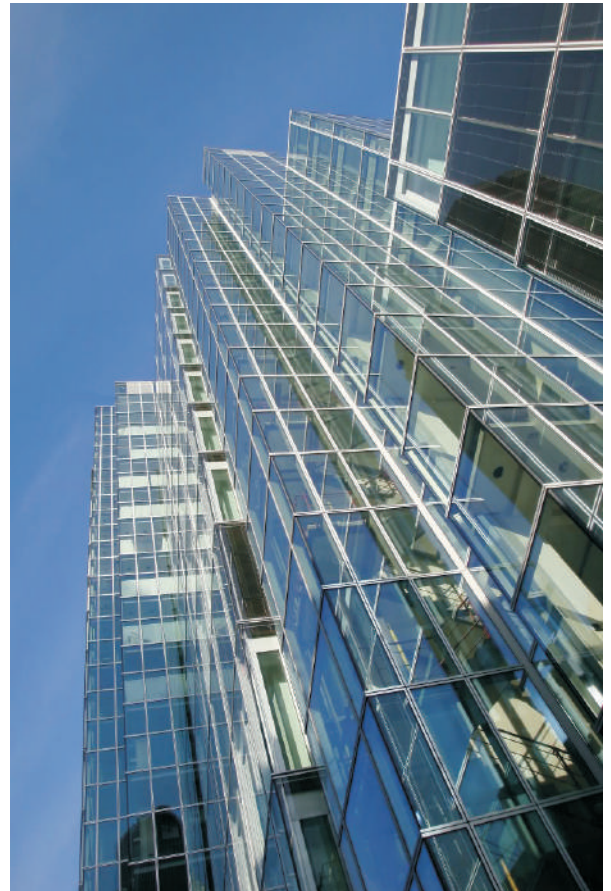
Open protocols and international standards enable products from different manufacturers and suppliers to communicate, share information and coexist on a shared network.

While we expect this and take it for granted in consumer and business products such as mobile phones and IT devices, all too often buildings still have stand-alone, proprietary systems.

Open protocol building services enable hardware from different manufacturers to network and communicate to enhance building operation. Lighting, air-conditioning, heating, security, access-control, fire alarms etc interact using a common language across a common platform and shared network, responding in real time to occupants' needs & occupancy patterns.

Open systems share hardware, network infrastructure & buswiring, resulting in a lower installed cost.

In addition, open systems share key data - for example, a single sensor can relate lighting & heating/cooling to occupancy - and this pooling of information increases energy savings, enhances the efficiency of building services, and achieves operational savings over the life of the building.



## closed systems

**Closed systems and proprietary protocols** restrict choice and limit savings.

Closed systems lock clients into a lifetime commitment to a single proprietary solution and vendor, and can only integrate with other systems through costly and specialist gateways.



## open systems

**Open systems and open protocols** are all about choice, economy and efficiency.

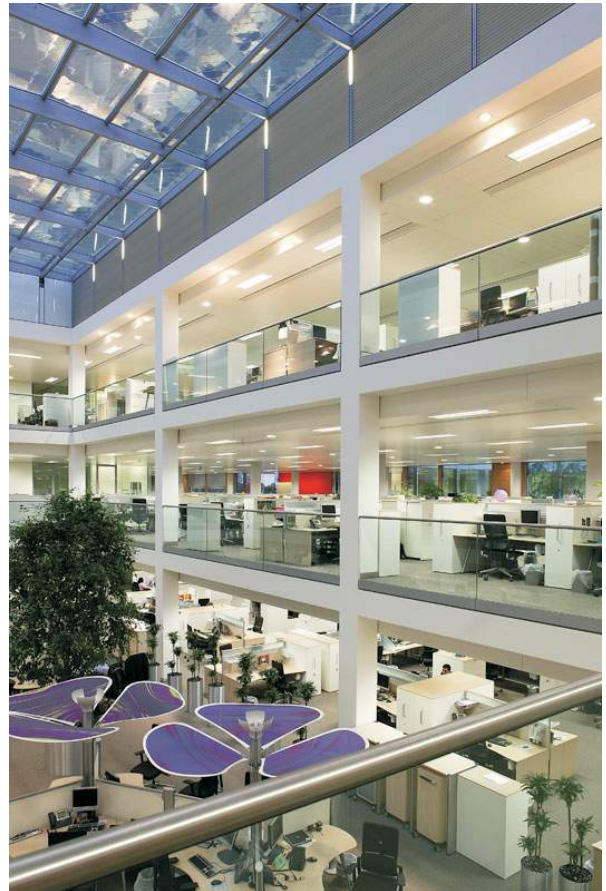
Open systems offer multiple sources of supply, maintenance and support, while sharing hardware and real time data achieves major savings in capital cost as well as operational savings over the life of the building.



## Benefits of open protocols

- open standard not owned by a single company
- system integration and interoperability
- optimised energy efficiency
- enhanced user control
- true device-level interoperability
- interchangeable devices from multiple suppliers
- reduce product and maintenance costs
- ensure long-term maintainability and future-proofing
- no reliance on single vendor
- single bus solution for all services
- reduced installation cabling costs
- eliminate duplication of sensors, cabling, tools
- product interchangeability

**Delmatic use the international open protocols of LonWorks and BACnet.**



## LonWorks



Lon is an international communication protocol for integrated services detailed in ISO 14908 “Open Data Communication in Building Automation, Controls & Building Management.”

Lon provides a number of major technical benefits over other protocols such as KNX including true distributed intelligence, handshake acknowledgements and confirmed receipt of messages, polarity-insensitive buswire as well as a flat network structure with no single point of failure.

Lon also operates at faster communication speeds than other protocols: for example, Lon is at least eight times faster than KNX - a critical aspect in large, integrated building networks.

## BACnet



BACnet is an international communication protocol detailed in ISO 16484 and a “Data Communication Protocol for Building Automation and Control Networks”

Delmatic integrate with other BACnet devices for the sharing of strategic data as well as triggering tasks and reporting back events and system statuses. Specific lighting details and granularity are typically provided via the Delmatic graphical software.



Abu Dhabi Investment Authority HQ

**Total integration between lighting, air-conditioning and solar shading at the ADIA Headquarters in Abu Dhabi makes it the most integrated and energy-efficient building in the region.**

The Delmatic system provides Dali dimming throughout the 130,000 sq.m building and interoperates seamlessly with the Somfy window blind and Siemens air-conditioning controllers using the Lon international open protocol. Products from the three suppliers share a common buswire and network architecture (achieving savings in both cabling and network installation) and pool data from shared devices using ISO standard-format messaging.

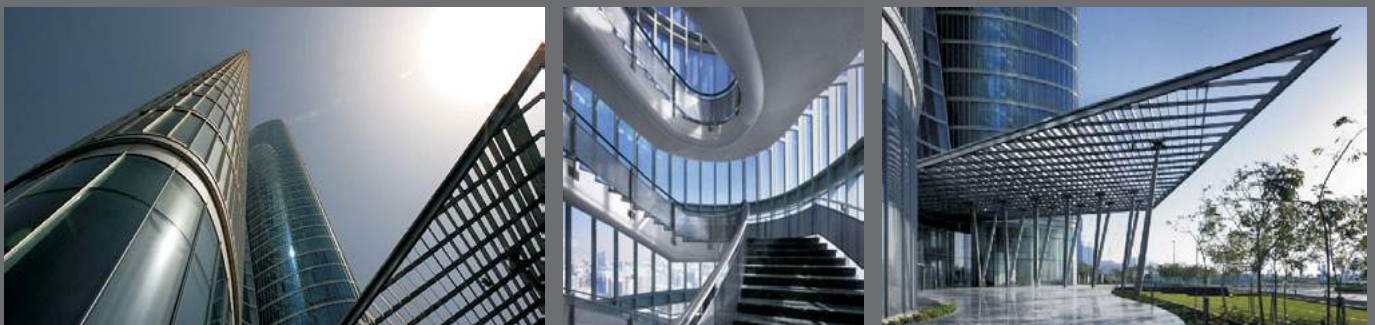
A Delmatic desktop controller in each office empowers staff with control of all three services and the ability to switch and dim lighting, raise, lower & tilt window blinds and adjust room temperature: an integral thermostat in the desktop controller measures room temperature at desk level avoiding the need for wall-mounted sensors.

Energy-efficiency is optimised through multisensors which monitor occupation and daylight in each office and receive user commands from the desktop controller. Presence-related lighting control coupled with user-adjustable dimming with daylight-linking options minimises energy consumption and reduces the cooling load.

Energy savings are further enhanced through the open protocol interoperability between the BMS and the lighting controls which relates HVAC to occupation and enables temperature control to be widened in unoccupied areas with additional energy savings. Studies by ASHRAE show that widening the temperature control band by just two degrees achieves 10% energy savings.

The complete system is managed and monitored through graphical software at the head-end PC which provides networked control of lighting throughout the building.

The ADIA project demonstrates what can be achieved to enhance efficiency and sustainability through the use of open protocols. If proprietary, closed systems had been selected for the lighting, blinds and HVAC such close integration and control of energy would have been impossible. The most obvious advantage of an international standard protocol is that various systems can communicate without the need for special interfaces and seamless, integrated building systems can be achieved while still retaining the unique advantages of specialist, expert-developed systems.







Interoperability enables controllers from different manufacturers to share a common buswire and network architecture and respond to messages in ISO standard-format from shared devices.

**Interoperability achieves major energy savings, reduces cabling and installation costs, cuts capital costs by avoiding the duplication of hardware and achieves daily operational savings over the lifetime of the building.**




The versatility of DALI and the variety of control approaches has resulted in it becoming the standard for all types of projects and applications, each with differing requirements met through the DALI technology.

educational




Coventry University, UK

commercial offices




Marks & Spencer Head Office, London, UK

medical




The London Clinic, UK

transportation



London Crossrail, UK

research



Masdar Institute, Abu Dhabi

recreation



Becontree Leisure Centre, UK

cultural



Ickworth House, UK

hotels



Oberoi Hotel, Dubai

retail



Fortnum and Mason, UK

## What is DALI ?

**DALI** stands for Digital Addressable Lighting Interface and is the global standard for digital dimming.

While proprietary controls and supplier-specific ballasts lock clients into one vendor, DALI is an international standard specified in IEC 60929 enabling components from different manufacturers to be seamlessly mixed and matched into complete systems.

DALI comprises a standard digital protocol that can be broadcast and received by any DALI ballast irrespective of make, type or supplier. DALI combines accurate, energy-efficient digital dimming with unique lamp and ballast failure detection and, as an open protocol, ensures clients receive all the advantages of DALI with the benefit of truly open sourcing and support.

## DALI is not only about ballasts and drivers

DALI is a transport medium so can be applied not only to luminaire ballasts and LED drivers but also to other system devices such as sensors and local user controls.


Delmatic use DALI technology in its purest form to achieve a total DALI solution, integrating DALI luminaires into a network of DALI control modules, DALI presence & absence detectors, DALI multisensors, DALI switches, DALI scene-set panels, DALI relays and DALI emergency devices – all monitored and managed in real time by powerful graphical software.

Delmatic offer an extensive range of DALI control modules to suit every degree of flexibility and installation type as well as innovative DALI solutions including **DALI Without Addressing** and **DALI Zero Power**.



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Dali zero power	page 14
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learn more about Dali	page 68

Book an in-house CIBSE-certified CPD covering the latest technical and application aspects of DALI.



## DALI networks

A basic DALI network comprises a maximum of 64 ballasts. The network can be linked into a seamless building-wide or site-wide solution, and Delmatic offer unlimited scalability by linking DALI networks across high speed open protocol backbones such as Lon or BACnet.

## DALI in numbers

Maximum number of DALI devices	64 per network
Number of DALI Groups	16 per network
Data Cable	2 wires
Data Encoding Method	Manchester
Data Baud Rate	2400 baud
Network Power Supply	24V DC 250mA

## DALI and maintenance

When 1-10V or DSI ballasts failed they were simply replaced on a like for like basis. DALI ballasts have a unique address so replacement ballasts have to be set to the same address as the original ballast: this requires a specialist addressing tool as well as availability of records showing the address of the failed ballast. This readdressing increases the cost and complexity of maintenance although Delmatic offer ways of avoiding this - see **DALI without addressing**.

## DALI power consumption

DALI ballasts accept digital signals which set the lamp output to zero while mains power is still supplied to the ballast. This means relays are not required to switch off the mains, so can simplify wiring and reduce equipment costs, but also means a permanent mains supply is applied to the ballasts. Because ballasts consume power to operate, they continue to draw power even when the lights are off. While this may not be an issue for one luminaire, the standby power consumption becomes significant on a project with thousands of luminaires. This can be avoided with Delmatic's **DALI Zero Power** feature which eliminates wasteful standby power consumption and achieves enhanced energy savings.



## DALI bus wiring

When selecting a DALI cable, a mains-rated cable should be used as follows:

DALI cable run length	Recommended minimum DALI cable conductor size
Less than 100 Meters	0.5mm <sup>2</sup>
100 to 150 Meters	0.75mm <sup>2</sup>
More than 150 Meters	1.5mm <sup>2</sup>
More than 300 Meters	Not recommended

To avoid the risk of mains power being connected to the DALI pair, Delmatic recommend a separate twisted pair cable be used for the DALI pair as Belcom 4001P2044-BW (twisted black/white) or equivalent.



## Setting DALI addresses

When they come out of the box every DALI ballast or driver is identical, so before you can communicate with an individual ballast it has to be assigned a unique address.

This is typically done by a process called randomisation which causes each ballast to generate a 24-bit random long address - a sufficiently large number that the chance of two ballasts generating the same address is remote.

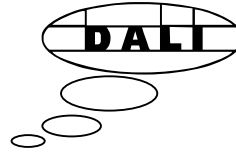
The long address is impracticable for everyday use so ballasts are subsequently assigned a 6-bit short address between 1 and 64. A signal is transmitted to the network and the first ballast to respond by flashing is physically identified and assigned address 1: this procedure is repeated until all ballasts on the network are addressed.

This process is very time-consuming and cannot be carried out until all the ballasts in an area are installed and powered up. On a large project, randomisation has major implications in commissioning time and cost so, to avoid this, many consultants specify **Dali plug-in** and **Dali broadcast** approaches instead.

## Using Dali addresses

DALI ballasts can be controlled via their group address or their short address.

A presence-detector controlling four luminaires/ballasts can, for example, use the group address to operate all four luminaires together, or, can send four individual commands using the short address for each ballast. Using the group address requires each ballast to be programmed with a group number and limits the number of groups on a network to the DALI maximum of sixteen. Using the short address avoids the DALI limitation of sixteen groups but can result in a Mexican Wave in large groups because of the delay in action between the first and last ballasts. In practice with small groups as required by Building Regulations and Environmental Rating Schemes this is not an issue.



## DALI integration

### Do more and save more with DALI integration.

DALI presence detectors and multisensors can control other building services such as heating, ventilation and air-conditioning and solar shading so that these are also linked to occupancy and daylight.

Integration enhances efficiency and can double energy savings without additional hardware cost.



## DALI Zero Power

### Save more energy with Dali Zero Power.

DALI digital ballasts consume power in standby mode. In a building with thousands of DALI luminaires, this represents a large percentage of the overnight standby power consumption and is very wasteful.

**DALI Zero Power** eliminates the standby consumption of DALI lamps using clever software algorithms which analyse occupancy and switch off power in areas where DALI lights are at zero output.

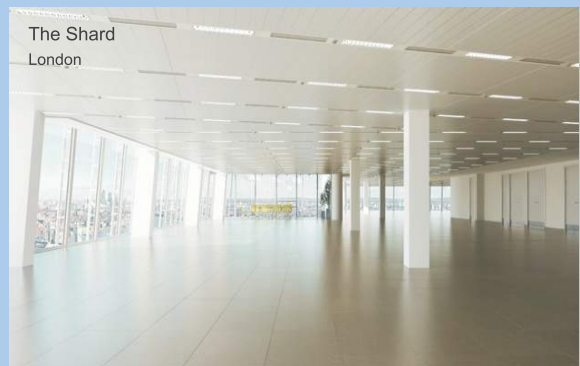


## DALI without addressing

### Save time and cost using DALI without addressing.

DALI enables luminaires to be individually addressed along a common buswire, but at the expense of time spent on site addressing every ballast and the need to re-address when replacing ballasts.

Delmatic offer a range of **DALI Plug-in modules** and **DALI Broadcast modules** which provide all the benefits of DALI without the need to address ballasts on site.



DALI is well known for its ability to individually address ballasts and drivers along a shared buswire but this approach requires on-site addressing, with time and cost implications, and is only one of a number of ways in which DALI may be applied.

Delmatic offer a wide range of DALI control modules to suit the varying degrees of flexibility and the differing installation approaches used within specific areas of a building.

Most projects combine DALI modules to achieve a solution that **optimises DALI control and minimises DALI addressing.**

The table below outlines the various DALI approaches and how they are typically applied to specific areas of a project while the following pages detail the application of the DALI Buswire, DALI Broadcast and DALI Plug-in approaches.



Area	Degree of flexibility	Type of installation	Recommended Dali approach and features
Lobbies Core Areas Corridors Toilets Car parks Plant rooms	Fixed - unlikely to change - therefore individual addressing of each Dali ballast is not required.	Hardwired	<b>Dali Broadcast</b> <span style="float: right;">see page 20</span>  Widely used in shell and core areas to provide individual addressing and monitoring of Dali channels without the need to individually address ballasts on site.  <b>No on-site addressing of ballasts required.</b>
Staircases (one group)	Fixed - unlikely to change (staircase lights on all floors energise when staircase in use)	Hardwired	<b>Dali Buswire</b> <span style="float: right;">see page 16</span>  Provides fully flexible addressing and monitoring of individual ballasts along a shared buswire. Ideal for vertical wiring on stairs, where a single conductor is used (such as busbar) or for suspended luminaires and chilled beams where a single buswire is simpler.  <b>Ballasts need to be individually addressed on site.</b>
Staircases (multiple groups)	Fixed - unlikely to change (staircase lights on specific floors energise based on floors in use)	Hardwired	
Offices	Flexible - very likely to change - so individual addressing of each Dali ballast is required.	Busbar or chilled beam	<b>Dali Plug-in</b> <span style="float: right;">see page 18</span>  Dali Plug-in is widely used in office areas to provide total flexibility with individual addressing and monitoring of each luminaire without the need to individually address ballasts on site together with the speed and convenience of plug-in connectivity.  <b>No on-site addressing of ballasts required.</b>
		Plug-in	

**DALI buswire modules provide total flexibility of control and enable individual addressing, switching, dimming & monitoring of DALI luminaires connected to a shared bus.**

DALI buswire modules are ideal for installations with suspended luminaires, chilled beams and busbar trunking as they provide the ability to individually control and monitor luminaires along a common two core buswire or conductor.

## DALI bus wiring

DALI uses a 2 core buswire to connect ballasts, drivers and sensors. The buswire is not polarity sensitive and can run alongside mains cables which power the DALI luminaires. The DALI network operates at 24V DC 250 mA and this voltage transmitted along the buswire also supplies power to DALI devices such as presence detectors & multisensors.

The DALI buswire operates at 24V ELV yet devices such as luminaire ballasts connected to the same buswire may only have functional isolation between mains and DALI. Therefore even though DALI itself operates at ELV, the installation should be treated as it if were operating at mains potential.

## DALI Buswire module

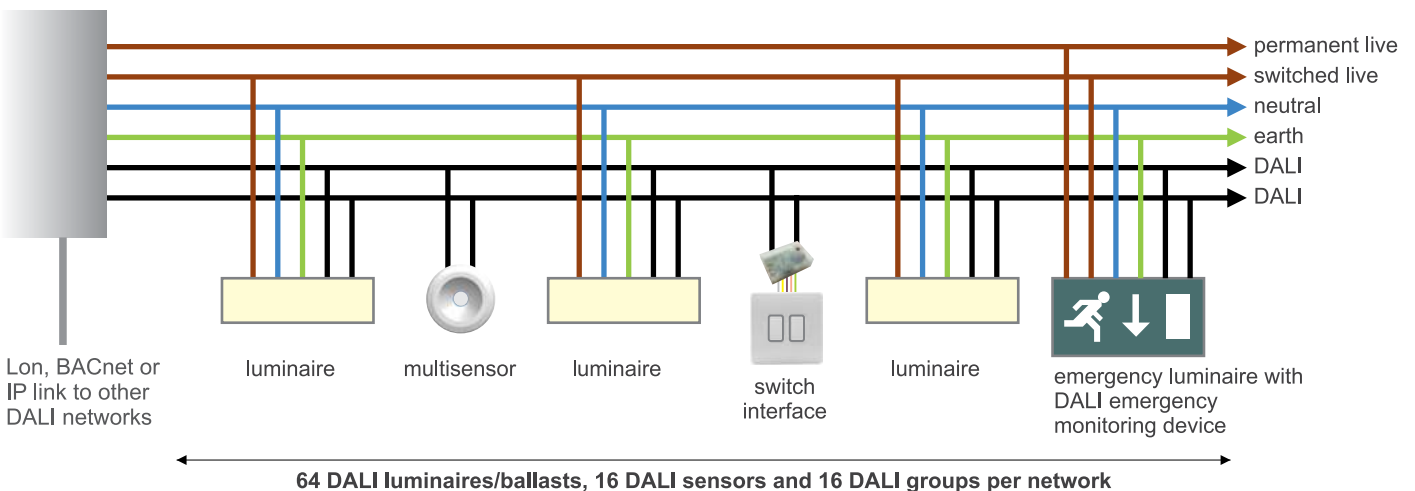
A DALI Buswire module connects to a network of DALI devices including DALI luminaires and emergency devices as well as user devices such as DALI sensors and switches.



DALI buswire modules are widely used with suspended luminaires, chilled beams and busbar trunking.

Delmatic's approach of using the DALI bus for the connection of DALI sensors and switches effectively reduces network cabling by 50%, while the ability to connect up to 16 DALI user devices without using any of the network 64 DALI addresses enables the full extent of DALI capability to be used.

Dali  
Buswire  
Module



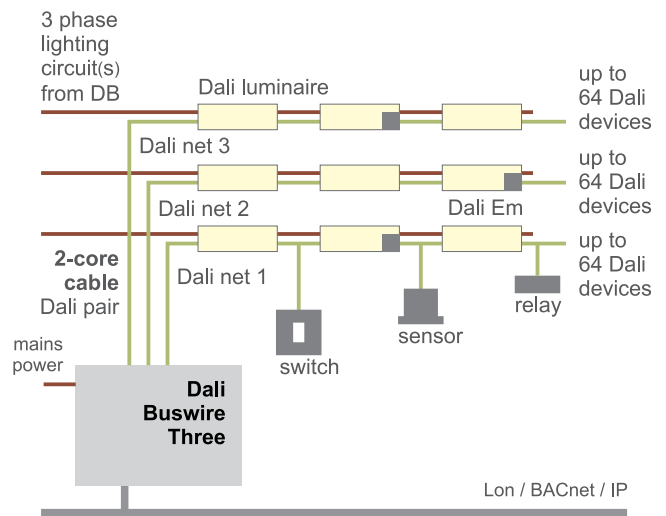


## DALI Buswire Three

The DALI Buswire Three module provides addressable control and monitoring of up to 192 DALI devices (64 x 3) and 48 DALI devices (16 x 3) on three DALI nets.

- individual addressing and monitoring of each DALI luminaire
- individual lamp and ballast failure monitoring
- individual DALI emergency light testing and monitoring
- 230V supply wired direct from distribution board to luminaires
- on-site addressing of DALI ballasts required

see datasheet on page 30

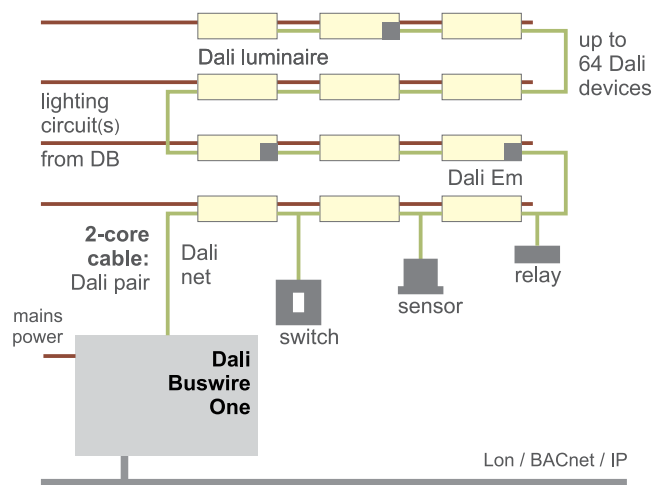


## DALI Buswire One

The DALI Buswire One module provides individual addressable control and monitoring of up to 64 DALI devices plus 16 DALI sensors/switches.

- individual addressing and monitoring of each DALI luminaire
- individual lamp and ballast failure monitoring
- individual DALI emergency light testing and monitoring
- 230V supply wired direct from distribution board to luminaires
- on-site addressing of DALI ballasts required

see datasheet on page 28

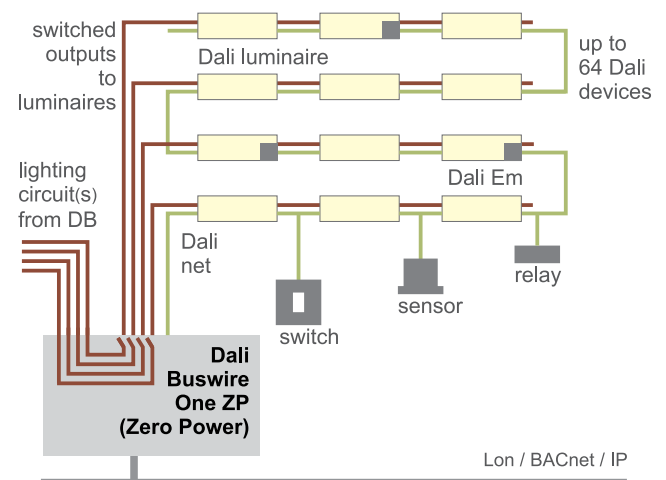


## DALI Buswire One ZP

The DALI Buswire One ZP module provides individual addressable control and monitoring of up to 64 DALI devices and 16 DALI sensors/switches, plus Zero Power switching of up to four lighting circuits powering the luminaires.

- individual addressing and monitoring of each DALI luminaire
- individual DALI emergency light testing and monitoring
- individual lamp and ballast failure monitoring
- four circuit Zero Power switching to enhance energy efficiency
- on-site addressing of DALI ballasts required

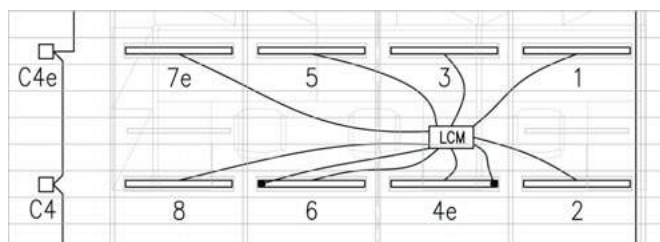
see datasheet on page 32



**DALI Plug-in modules provide total flexibility with individual control and monitoring of every light fitting, as well as quicker installation and faster commissioning.**

DALI plug-in modules contain pre-addressed ports so ballasts do not need to be addressed individually after installation: in this way, DALI plug-in modules achieve major savings in commissioning time and cost, and simplify maintenance as ballasts can be replaced without the need to assign a replacement address.

Widely used in areas with suspended ceilings, DALI plug-in modules offer the speed and convenience of total plug-in connectivity, acting as local hubs for the rapid connection of luminaires and local control devices.



Detail of a typical plug-in module application.

Table detailing the features of Dali Plug-in Modules

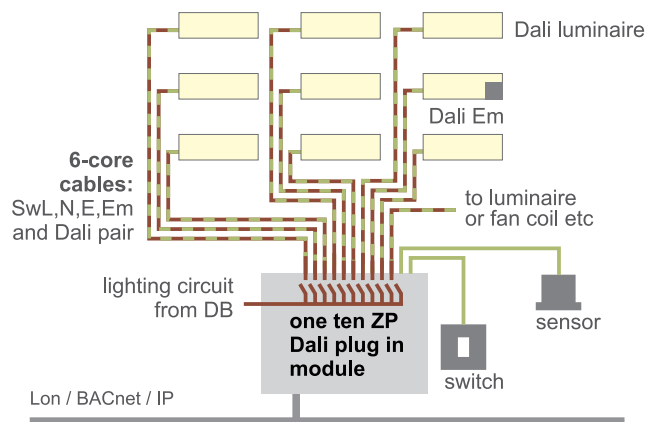
feature	Dali One Ten ZP	Dali Zero Twelve
number of individually addressed DALI outputs	10	12
number of switched 230V outputs	10	0
number of individually addressed switching relays	10	0
number of module output ports	10	12
number of pins per port	6	2
outputs per port	Switched Live, Maintained Live, N,E plus Dali pair	Dali pair
230V supply to luminaires	via module	direct from DB
number of lamp and ballast failure monitoring points	10	12
number of emergency device monitoring points	10	12
integrated DALI zero power function	yes	no
Dali without addressing function (ie. no onsite addressing)	yes	yes

## DALI One Ten ZP

The DALI One Ten ZP plug-in module provides addressable digital control of ten DALI luminaires and contains ten relays providing DALI Zero Power and switching of other devices including fan-coils.

- 10 individually addressed DALI outputs
- 10 individually addressed 230V switched outputs via relays
- individual lamp and ballast failure monitoring
- individual DALI emergency light testing and monitoring
- 10 Zero Power switched outputs
- 6-pin ports provide switched 230V & DALI pair to each luminaire
- **avoids on-site addressing of DALI ballasts**

see datasheet on page 34

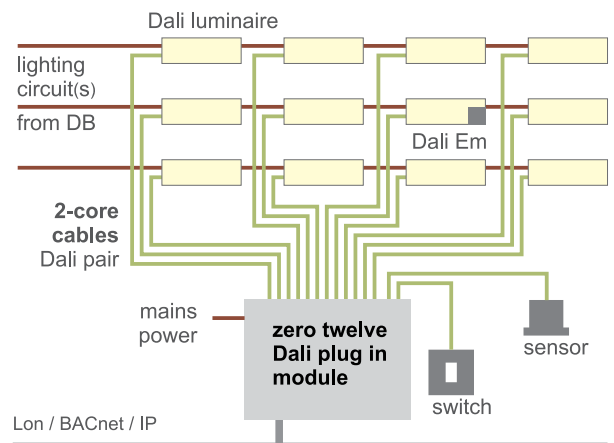


## DALI Zero Twelve

The DALI Zero Twelve plug-in module provides addressable digital control of twelve DALI luminaires.

- 12 individually addressed DALI outputs
- individual lamp and ballast failure monitoring
- individual DALI emergency light testing and monitoring
- 230V supply wired direct from distribution board to luminaires
- 2-pin ports provide DALI pair to each luminaire
- **avoids on-site addressing of DALI ballasts**

see datasheet on page 36

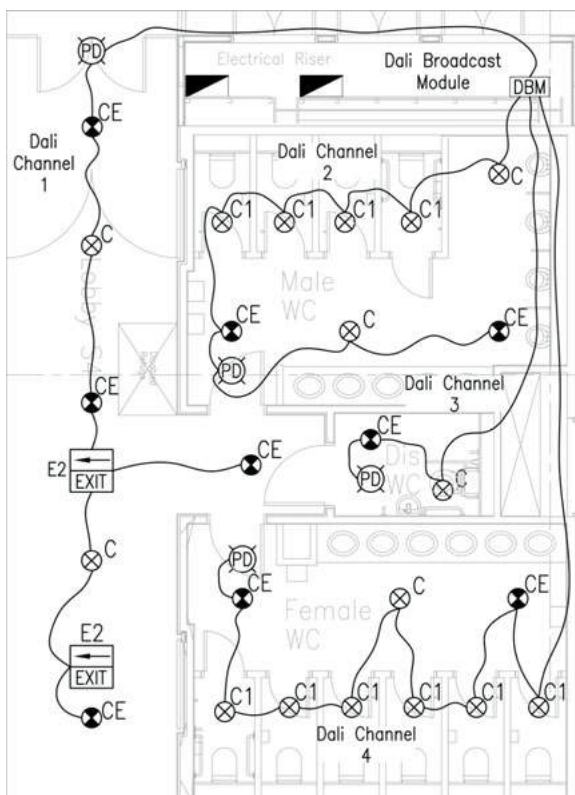


**DALI Broadcast modules control hard-wired channels of lighting and provide the dimming and monitoring benefits of DALI without the need to address ballasts on site.**

DALI Broadcast modules are frequently used in corridors and cores where dimming and monitoring is required but flexible individual control of luminaires is not needed.

The modules broadcast dimming commands to each DALI channel (for example, lobby, male toilet, female toilet etc) while monitoring each luminaire and ballast and displaying failures per channel: emergency luminaires are monitored on an individual basis.

Lighting circuits wire direct from the distribution board to the luminaires while a DALI bus runs from the module to each DALI channel of luminaires & devices.



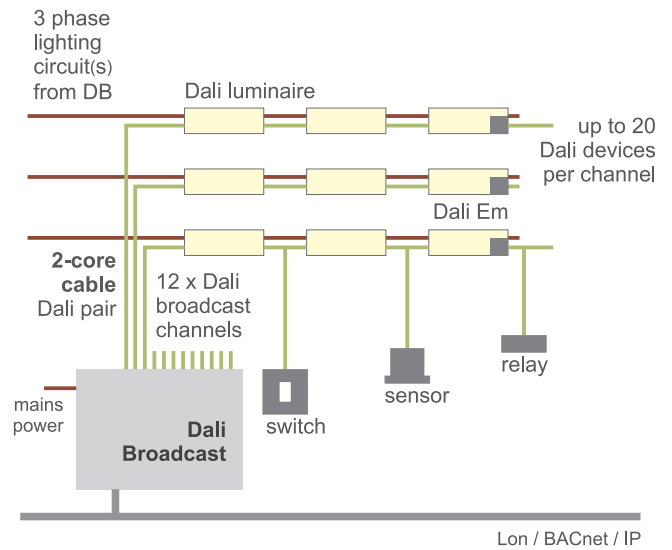
Detail of a typical broadcast module application.

## DALI Broadcast

The DALI Broadcast module provides addressable digital control of hard-wired channels of DALI luminaires: up to 20 DALI luminaires and devices can connect to each of twelve channels.

- 12 individually addressed DALI channel output
- individual lamp and ballast failure monitoring on a channel basis
- individual DALI emergency light testing and monitoring
- avoids on-site addressing of DALI ballasts

see datasheet on page 38

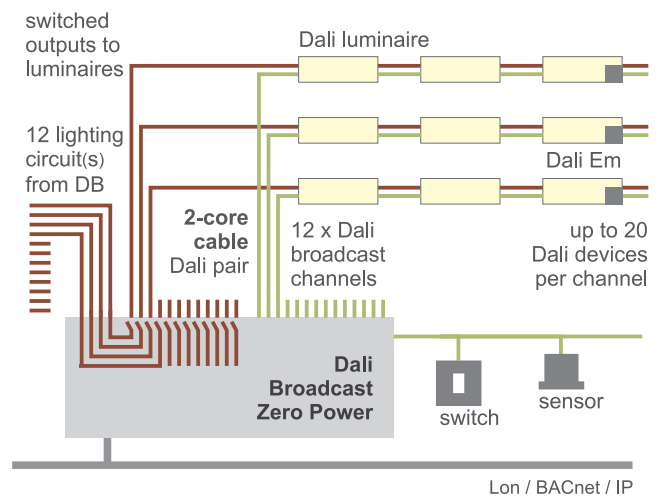


## DALI Broadcast ZP

The DALI Broadcast ZP module provides addressable digital control of hard-wired channels of DALI luminaires and contains relays providing DALI Zero Power for each channel.

- 12 individually addressed DALI outputs
- individual lamp and ballast failure monitoring on a channel basis
- individual DALI emergency light testing and monitoring
- 12 circuit Zero Power switching of lighting circuits
- avoids on-site addressing of DALI ballasts

see datasheet on page 40

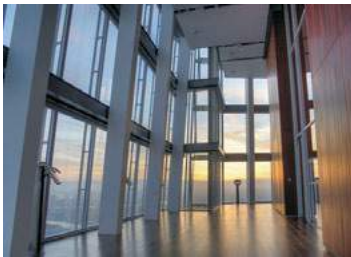




The Shard in London is a text-book example of how to apply Dali technology, and demonstrates the benefit of applying different Dali strategies to different areas of a building.

Dali is used throughout the project - within shell and core areas, staircases, lobbies and toilets, viewing galleries, observatory and reception foyers, retail malls and office tenant fit-out floors. Across all these areas, Dali is applied in different ways to best match the flexibility required with the preferred method of electrical installation while minimising or even completely avoiding the need to address Dali ballasts.

The project makes full use of Delmatic's extensive range of Dali hardware – Dali Plug-in modules, Dali Broadcast modules and Dali Buswire modules as well as Dali presence detectors, multisensors, switch-interfaces, scene-set panels, Dali relays and Dali emergency monitoring devices.



### Viewing galleries and public areas

**Scene-set** switching and dimming with **daylight-linked** control of a range of lighting sources including switching, Dali and DMX.



### External lighting

**Circuit switching** based upon calendar schedule with solar clock and photocell, and integration with colour changing controls.



### Shell and core and toilets

**Dali Broadcast** modules & **Dali Sensors** control channels of Dali lighting providing lamp/ballast failure and emergency monitoring without the need to address ballasts.

**Dali Presence Detectors** relate lighting to occupancy and **Dali Relays** control water valves.



### Office areas

**Dali Plug-in** modules provide tenants with total flexibility and rapid plug-in connectivity, individual lamp/ballast failure, and Dali emergency monitoring with no need to address ballasts after installation or replacement.

**Dali Multisensors** link lights to occupation & daylight.



### Reception and retail areas

**Dali Scene-set panels** combine with **Dali multisensors** to provide scene-set and daylight-linked control of a range of lighting including switching, Dali dimming and DMX dimming. **Dali Broadcast** modules control Dali lighting channels providing lamp/ballast failure and emergency monitoring without the need to address ballasts.



### Staircases

**Dali Buswire** modules connect to Dali lights, Dali Presence Detectors and Dali emergency devices across multiple floors. Detectors energise lighting above and below the floor on which motion is sensed lighting the route ahead.



### Emergency monitoring

The system includes testing and monitoring of emergency lighting throughout the building (including plant rooms and non-controlled areas) with central management, logging and reporting at the network head-end PC.



**Masdar Institute, located at the heart of Abu Dhabi's Masdar sustainable city, is the world's first university focused on future energy and sustainability. The Institute is powered entirely by rooftop photovoltaic panels, remote solar arrays and windmills, so sustainability is right at the top of the agenda.**

An advanced Delmatic Dali solution combines Dali Zero Power, IP and Lon technologies to optimise energy-efficiency across the campus including study and research areas, laboratories, offices, recreation and sports facilities as well as the residential student accommodation.

The system manages every watt of power to reduce the demands on renewable energy. Dali is used in its purest form to achieve a total Dali solution, and the system integrates Dali luminaires into a network of Dali Buswire and Dali Zero Power modules, Dali presence and absence detectors, Dali multisensors, Dali switches, Dali scene-set panels, and Dali relays – all configured, monitored and managed in real time by powerful graphical software.

The system optimises energy and operational efficiency by precisely relating lighting to occupancy and continually adjusting lighting levels to account for daylight contribution: Delmatic's innovative Dali Zero Power feature eliminates overnight standby power consumption to substantially increase energy efficiency.

Open protocol integration with the BMS and sharing data from Delmatic Dali presence detectors relates HVAC to occupation, enabling temperature control to be widened in unoccupied areas with additional energy savings.

Overall building sustainability is enhanced by monitoring lamp and ballast failure in real time as well as logging the runtime of every luminaire to optimise relamping and avoid premature replacement (with associated environmental and disposal benefits). In addition, the use of a single buswire network for the connection of all devices reduced the extent of cabling, minimising the use of scarce resources including copper.

The dynamic system receives signals from the power generation network and initiates load-shedding routines and scenarios which selectively dim lighting across the site and reduce power demand to match the finite renewable energy available.

As the city network expands, the Institute will become a key and active participant in managing energy demand and supply across smart grids in a new, connected environment.



Delmatic Lightscape® software is the client's window into the lighting installation, displaying real-time information on system and lighting operation while providing building supervisors with powerful tools for managing and monitoring lighting across one or multiple sites.

The software comprises a full graphical interface which identifies each luminaire against background AutoCAD building and lighting layouts, and incorporates a hierarchy of access levels to prevent unauthorised access or modifications to the system configuration.



## Remote access & monitoring



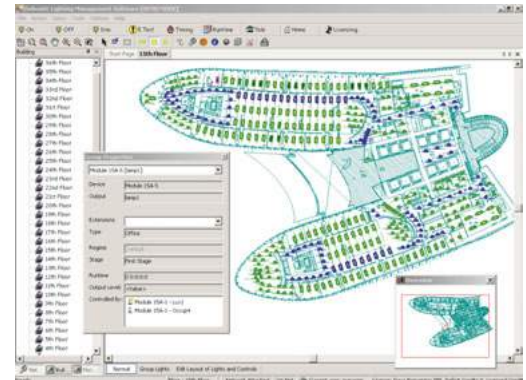
**Remote monitoring** enables lighting to be configured, monitored and controlled from a remote location, and system alerts to be transmitted to mobile devices.

**Remote health-checks** provide proactive management of the system ensuring lighting is operating at maximum efficiency.

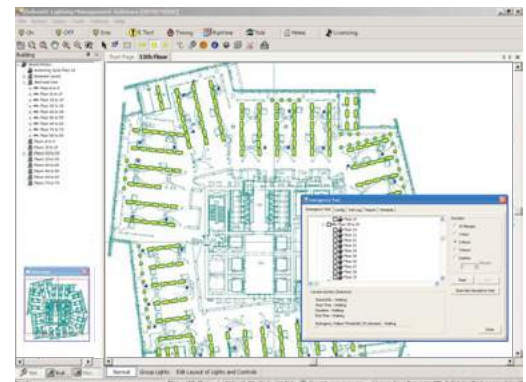


Lightscape features can include:

- active status of each luminaire
- dynamic feedback from system hardware
- real-time Dali lamp and ballast failure
- virtual wiring for software grouping of lighting
- drag-and-drop auto-binding configuration
- multi-level password protection and access rights
- emergency light testing and monitoring
- Dali emergency device testing and monitoring
- lamp hours-run logging
- generation of optimised luminaire relamping schedules
- adjustment of presence detector time-out period
- configuration of sensor as presence or absence detection
- adjustment of photocell sensitivity thresholds
- comprehensive calendar time scheduler
- multiple time regimes for tenanted areas
- special timing patterns for holiday periods
- astronomical solar clock functions
- biodynamic control routines
- loadshedding scenarios and scenes
- hardware monitoring & self-healing diagnostics
- integration with BMS and other head-end systems
- seamless operation with Lon/BACnet devices eg. blinds & HVAC
- ability to export data for further analysis
- multi-client access via building IT network
- context-sensitive alerts with e-mail & PDA options
- internet access for remote monitoring and control
- network tree (architecture & hardware inventory)
- automatic remote backup and data storage



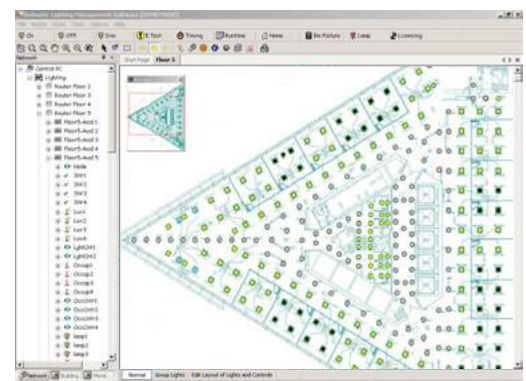
the software provides real-time monitoring of the lighting installation and the ability to reconfigure switching and dimming arrangements



lamp-run time monitoring and virtual metering enables energy usage to be analysed and apportioned across various building cost centres



the graphics enable various layers to be displayed - building, lights, sensors, switches, etc - while the system explorer tree shows the architecture and status of the lighting management hardware



the complete system operation is software configurable including the time-out periods of presence detectors and daylight-linking thresholds














The complete lighting management system can be monitored, managed and configured from any network or mobile device.



The Shard uses a comprehensive range of Delmatic hardware including Dali Plug-in, Dali Broadcast and Dali Buswire modules, Dali Relays, and circuit Switching Modules, as well as site-wide emergency monitoring

Delmatic offer a wide range of lighting control modules to suit a variety of lamp technologies, installation approaches and degrees of flexibility.

	<p><b>Dali Buswire One</b> Addressable control of 64 Dali lamps</p>	page <b>28</b>
	<p><b>Dali Buswire Three</b> Addressable control of 192 Dali lamps</p>	page <b>30</b>
	<p><b>Dali Buswire One ZP (Zero Power)</b> Addressable control of 64 Dali lamps plus Zero Power</p>	page <b>32</b>
	<p><b>Dali Plug-in One Ten ZP (Zero Power)</b> Pre-addressed control of 10 Dali lamps plus Zero Power</p>	page <b>34</b>
	<p><b>Dali Plug-in Zero Twelve</b> Pre-addressed control of 12 Dali lamps</p>	page <b>36</b>
	<p><b>Dali Broadcast</b> Pre-addressed control of 12 Dali channels</p>	page <b>38</b>
	<p><b>Dali Broadcast ZP (Zero Power)</b> Pre-addressed control of 12 Dali channels plus Zero Power</p>	page <b>40</b>
	<p><b>Six Six (switching)</b> Addressable switching of six lighting circuits</p>	page <b>42</b>
	<p><b>Twelve Twelve (switching)</b> Addressable switching of twelve lighting circuits</p>	page <b>44</b>
	<p><b>Dali One Relay</b> Switching relay that connects to Dali network</p>	page <b>46</b>
	<p><b>RS232 / 485 / DMX interface</b> Interface with RS 232, 485 and DMX protocols</p>	page <b>47</b>

# DALI Buswire One module

delmatic.com

product ref: 205A1

sheet 1/2

The module provides individual addressable control and monitoring of up to 64 DALI devices as well as enabling the connection of 16 DALI sensors/switches.

- individual addressing and monitoring of up to 64 DALI ballasts / drivers
- also accepts connection of additional 16 DALI sensors / switches
- individual DALI lamp and ballast failure monitoring
- individual DALI emergency light testing and monitoring per DALI device
- DALI sensors, switches and emergency devices connect to the DALI bus
- designed for single or two-fix installation via wall-mount or drop-rod

The module provides a DALI signal to each lamp while the mains supply is fed directly to the lamps and powers the module. Multiple power supplies to the lamps are possible but because DALI is not SELV they should be limited to single phase.



## Buswire installation

The DALI Buswire One enables control of individual Dali lamps connected to a shared two-core Dali buswire or flexible conduit installation: the Dali bus to lamps and devices can run alongside mains cables or as part of a five core cable.

## Busbar installation

The DALI Buswire One enables control of individual Dali lamps connected to a shared busbar. 3 poles of the busbar provide L, N & E while the Dali output from the module uses 2 poles to connect to Dali lamps & Dali devices.

## Chilled beam installation

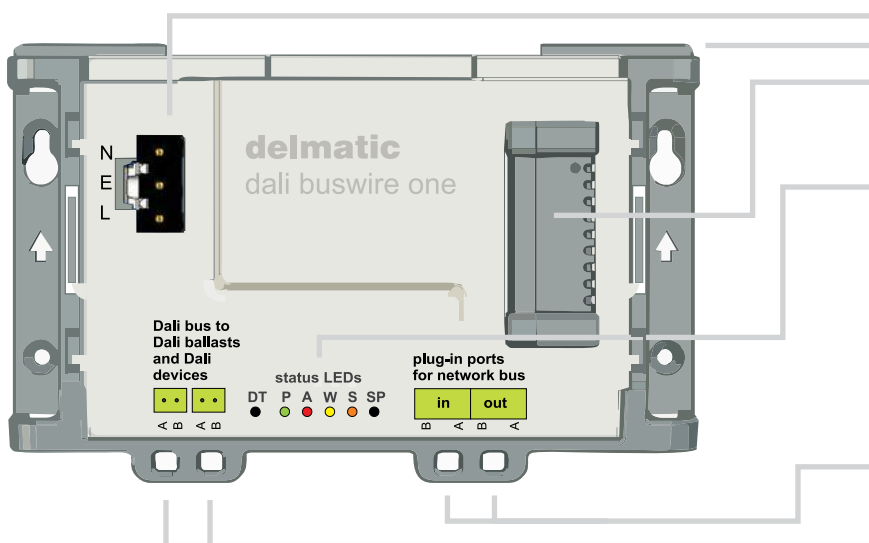
The DALI Buswire One enables individual control of Dali lamps connected to a single two core bus within the chilled beam. The lighting circuit is wired direct to the lamps: the Dali bus to lamps and devices can run alongside mains cables or as part of a five core cable.

## Dali ballast addressing

The ability to individually address DALI lamps on a common buswire requires each ballast to be addressed; this has to be done on after installation on site with associated time and cost considerations: addresses are assigned using a hand-held programmer or laptop computer.

**To avoid the need to address ballasts on-site, Delmatic offer a range of DALI controllers including DALI Broadcast Modules and DALI Plug-in Modules.**

## module features



plug-in mains input (plug supplied with module)

frame with clip-in module

plug-in intelligent pod (80-003) provides distributed intelligence, stores module operational parameters and enables seamless integration with other Lon devices

diagnostic LEDs and service pin

**Power LED** - indicates module is powered up

**Alert LED** - lights to indicate a short on the Dali bus

**Wink LED** - winks when instructed by software

**Service LED** - lights when service pin pressed and flashes if module has no application software

**SP service pin** - uploads module address

**DT Dali test button** - pressing button for 2 seconds transmits an on/off/dimming command to all ballasts enabling the operation of luminaires to be verified.

**Lon bus** - plug-in terminals for connection of two core Lon bus (from router or previous module and to next module). plug ref. 91041

**Dali bus** to up to 64 Dali ballasts/devices and up to 16 Dali sensors/switches. plug ref. 91040 connects to D+ & D- (two ports operate in parallel)

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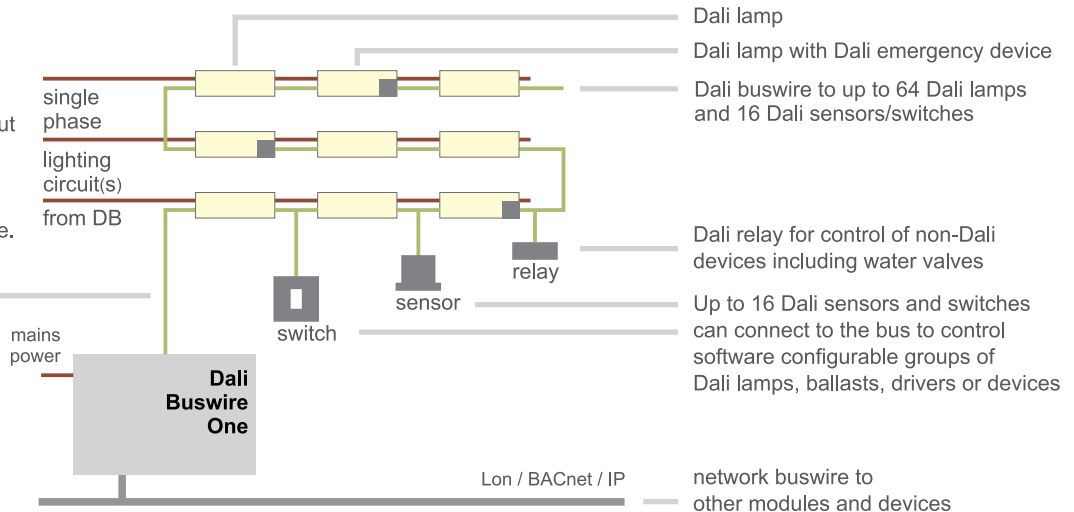
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## connection details

Lighting circuit(s) wire direct to lamps from distribution board. Multiple circuits are possible but because DALI is not SELV should be limited to single phase. For three-phase wiring see Dali Buswire Three module.

**2-core cable**  
Dali +  
Dali -



## technical details

### outputs

Mains supply to power lamps is wired direct from distribution board to lamps. DALI buswire output controls up to sixty-four DALI ballasts/drivers. Module is equipped with two-ports for connection of Dali buswire.

### Dali monitoring

Module monitors and displays individual lamp/ballast failure for up to sixty-four Dali devices. Module monitors individual Dali emergency lamps/devices and displays emergency lamp and device failures on an individual basis.

### Dali sensors, switches and emergency devices

Module accepts 16 DALI sensors, switches and switch interfaces on the Dali buswire plus Dali emergency devices .

### Dali bus connection

Two 2-pin ports for Dali bus connection (max 1.5 sq.mm cable): the two ports operate in parallel.

### network Lon bus inputs

2 plug-in ports for twisted pair Lon network bus connection.

### buswire specification

for latest buswire specifications and cable lengths refer to Buswire Specification data sheet

### supply voltage

1 x 220-240V~ 50/60Hz single phase power supply to power module. (three-pin plug-in mains input connector supplied)

### diagnostic LEDs

Power LED - shows secondary power circuit operational.  
Alert LED - indicates short on the sensor bus or issue with Communication card.  
Wink LED - winks when instructed through software  
Service LED - indicates fault mode.

### construction

flame-retardant low smoke moulded housing

### ambient temperature / relative humidity

0 to +50°C / 20% to 90% non condensing

### dimensions (mm)

225 w x 133 h x 66 d  
100mm depth including mains plug

## Lon specification

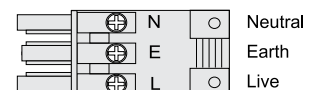


FT5000 Neuron and FTX3 transceiver conforms to LonMark 3.4 profiles:

16 switch objects	# 3200
16 light sensor objects	# 1010
16 occupancy sensor objects	# 1060
16 open-loop actuator objects	# 0003
16 occupancy controller objects	# 3071
16 light controller objects	# 3050

## plug details

**mains input to module** (plug supplied)  
3 pole female plug with locking device  
(Live, Earth, Neutral)



# DALI Buswire Three module

The module provides individual addressable control and monitoring of up to 192 DALI lamps as well as enabling the connection of 48 DALI sensors/switches.

- individual addressing and monitoring of up to 192 DALI ballasts / drivers
- also accepts connection of additional 48 DALI sensors / switches
- individual DALI lamp and ballast failure monitoring
- individual DALI emergency light testing and monitoring per DALI device
- DALI sensors, switches and emergency devices connect to the DALI bus

The module provides a DALI signal to each lamp while the mains supply is fed directly to the lamps and powers the module. The module incorporates three independent DALI controllers enabling three phase supplies to the lights.



## Buswire installation

The DALI Buswire Three enables control of individual Dali lamps connected to a shared two-core Dali buswire or flexible conduit installation: the Dali bus to lamps and devices can run alongside mains cables or as part of a five core cable.

## Busbar installation

The DALI Buswire Three enables control of individual lamps connected to a shared busbar. 3 poles of the busbar provide L, N & E while the Dali output from the module uses 2 poles to connect to Dali lamps & Dali devices.

## Chilled beam installation

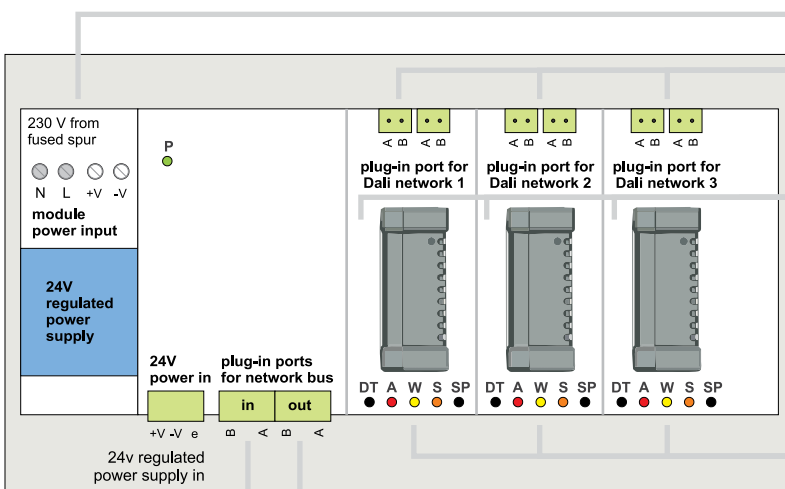
The DALI Buswire Three enables individual control of Dali lamps connected to a two core bus within the chilled beam. The lighting circuit is wired direct to the lamps: the Dali bus to lamps and devices can run alongside mains cables or as part of a five core cable.

## Dali ballast addressing

The ability to individually address DALI lamps on a common buswire requires each ballast to be addressed; this has to be done after installation on site with associated time and cost considerations: addresses are assigned using a hand-held programmer or laptop computer.

**To avoid the need to address ballasts on-site, Delmatic offer a range of DALI controllers including DALI Broadcast Modules and DALI Plug-in Modules.**

## module features



**mains input** (power supply to module)

**Dali network terminals** to three Dali networks: each network connects to up to 64 Dali ballasts/devices: Two core Dali bus cable per network. Two ports for each network operate in parallel. (two bus plugs supplied per network - plug ref. 91040)

three **plug-in intelligent pods** (80-003): each pod provides individual addressing of 64 Dali devices plus connection of 16 Dali sensors/ switches, distributed intelligence, stores module operational parameters, enables seamless integration with other open protocol devices

**diagnostic LEDs and service pin**

**Power LED** - indicates module is powered up

**DT Dali test button** - pressing button for 2 seconds transmits an on/off/dimming command to all ballasts enabling the operation of luminaires to be verified.

**Alert LED** - lights to indicate a short on the Dali bus

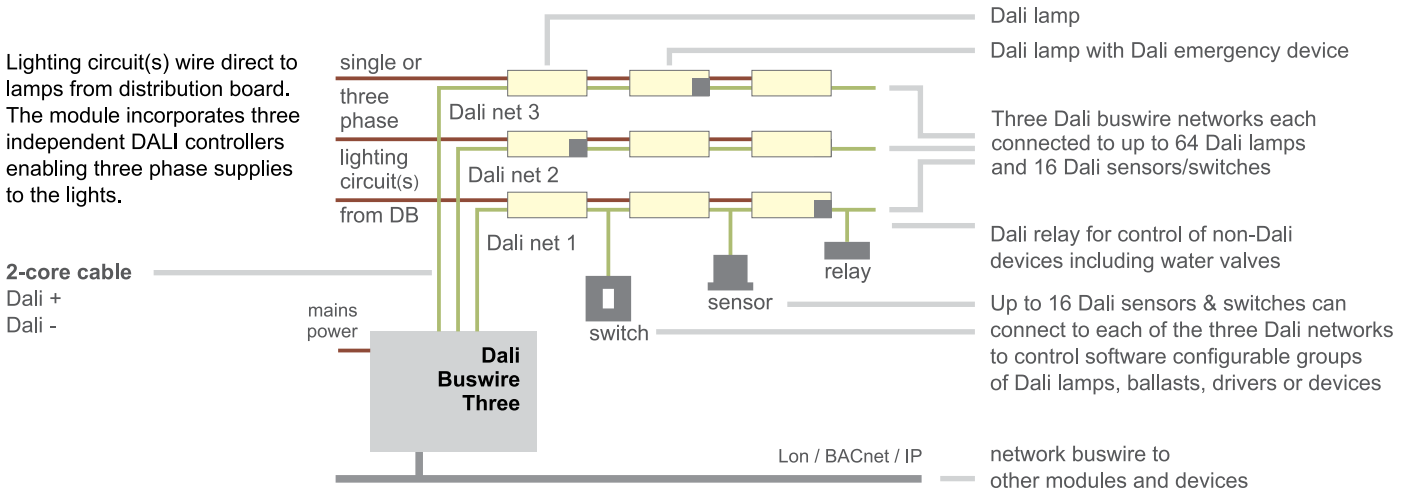
**Wink LED** - winks when instructed by software

**Service LED** - lights when service pin pressed and flashes if module has no application software

**SP service pin** - uploads module address

**bus terminals** - plug-in terminals for connection of two core Lon bus (from router or previous module and to next module). (two bus plugs supplied - plug ref. 91041)

## connection details



## technical details

### outputs

Mains supply to power Dali lamps is wired direct from distribution board to lamps. Each of the three DALI buswire outputs controls up to sixty-four DALI ballasts/drivers. Module is equipped with two-ports for connection of each Dali network buswire.

### Dali monitoring

Module monitors and displays individual lamp/ballast failure for up to 192 (3x64) Dali devices. Module monitors individual Dali emergency lamps/devices and displays emergency lamp and device failures on an individual basis.

### Dali sensors, switches and emergency devices

Module accepts 16 DALI sensors, switches and switch interfaces on each Dali network (total 48 Dali sensors/switches) plus Dali emergency devices .

### Dali bus connection

Two 2-pin ports per Dali network bus connection (max 1.5 sq.mm cable): the two ports operate in parallel.

### network Lon bus inputs

2 plug-in ports for twisted pair Lon network bus connection.

### buswire specification

for latest buswire specifications and cable lengths refer to Buswire Specification data sheet

### supply voltage

1 x 220-240V~ 50/60Hz single phase power supply to power module.

### diagnostic LEDs

Neon - shows 240v present.  
Power LED - shows secondary power circuit operational.  
Alert LED - indicates short on the sensor bus or issue with Communication card.  
Wink LED - winks when instructed through software  
Service LED - indicates fault mode.

### construction

painted galvanised steel enclosure finished RAL 7035

### ambient temperature / relative humidity

0 to +50°C / 20% to 90% non condensing

### dimensions (mm)

335 w x 100 h x 70 d

## Lon specification



FT5000 Neuron and FTX3 transceiver conforms to LonMark 3.4 profiles:

48 switch objects	# 3200
48 light sensor objects	# 1010
48 occupancy sensor objects	# 1060
48 open-loop actuator objects	# 0003
48 occupancy controller objects	# 3071
48 light controller objects	# 3050

# DALI Buswire One ZP module

delmatic.com

product ref: 205Z1

sheet 1/2

The module provides individual addressable control and monitoring of up to 64 DALI devices as well as enabling the connection of 16 DALI sensors/switches: in addition the module provides energy-optimised DALI Zero Power switching of up to four lighting circuits powering the lamps to eliminate standby power consumption.

- individual addressing and monitoring of up to 64 DALI ballasts / drivers
- also accepts connection of additional 16 DALI sensors / switches
- individual DALI lamp and ballast failure monitoring
- individual DALI emergency light testing and monitoring per DALI device
- DALI sensors, switches and emergency devices connect to the DALI bus
- energy-efficient DALI Zero Power avoids standby power consumption
- four switched 230V outputs via addressable relays

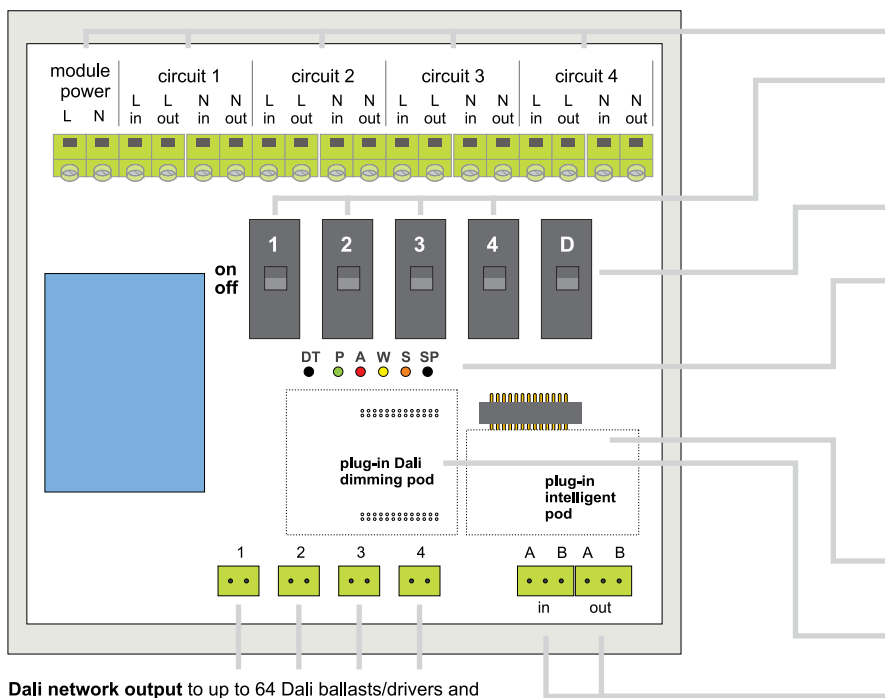
The module individually addresses up to 64 DALI lamps via the two core DALI bus. The mains supply to the lamps is fed via four 20A switching relays integral with the module: software algorithms analyse occupancy and the relays switch off power on each output where all DALI lights are at zero output.

Up to four circuits are available to power the lamps but because DALI is not SELV they should be limited to single phase.

## Dali ballast addressing

The ability to individually address DALI lamps on a common buswire requires each ballast to be addressed; this has to be done after installation on site with associated time and cost considerations: addresses are assigned using a handheld programmer or laptop computer.

## module features



**Dali network output** to up to 64 Dali ballasts/drivers and up to 16 Dali sensors/switches. Four ports operate in parallel and relate to switched relay outputs 1 to 4.



**To avoid the need to address ballasts on-site, Delmatic offer a range of Dali controllers including Dali Broadcast Modules and Dali Plug-in Modules.**

**mains terminals** for connection of incoming mains circuits and switched outputs to lamps. Module 230V power from fused spur or one of incoming circuits

**four 16A mechanically-latched relays (1-4)** with on/off status indication and manual override - in the event of electronics failure relays maintain their last state and may be manually operated on and off from override switches accessible through the module lid.

**Dali override relay** which opens/closes the Dali bus to the Dali lamps and enables all powered Dali lamps to be set to default 100% operation.

**diagnostic LEDs and service pin**

**Power LED** - indicates module is powered up

**Alert LED** - lights to indicate a short on the Dali bus

**Wink LED** - winks when instructed by software

**Service LED** - lights when service pin pressed and flashes if module has no application software

**SP service pin** - uploads module address

**DT Dali test button** - pressing button for 2 seconds transmits an on/off/dimming command to all ballasts enabling the operation of luminaires to be verified.

**plug-in intelligent pod** provides distributed intelligence, stores module operational parameters and enables seamless integration with other Lon devices

**plug-in DALI dimming pod**

**Lon bus** - plug-in terminals for connection of polarity insensitive two core Lon bus (in from router or previous module and out to next module).

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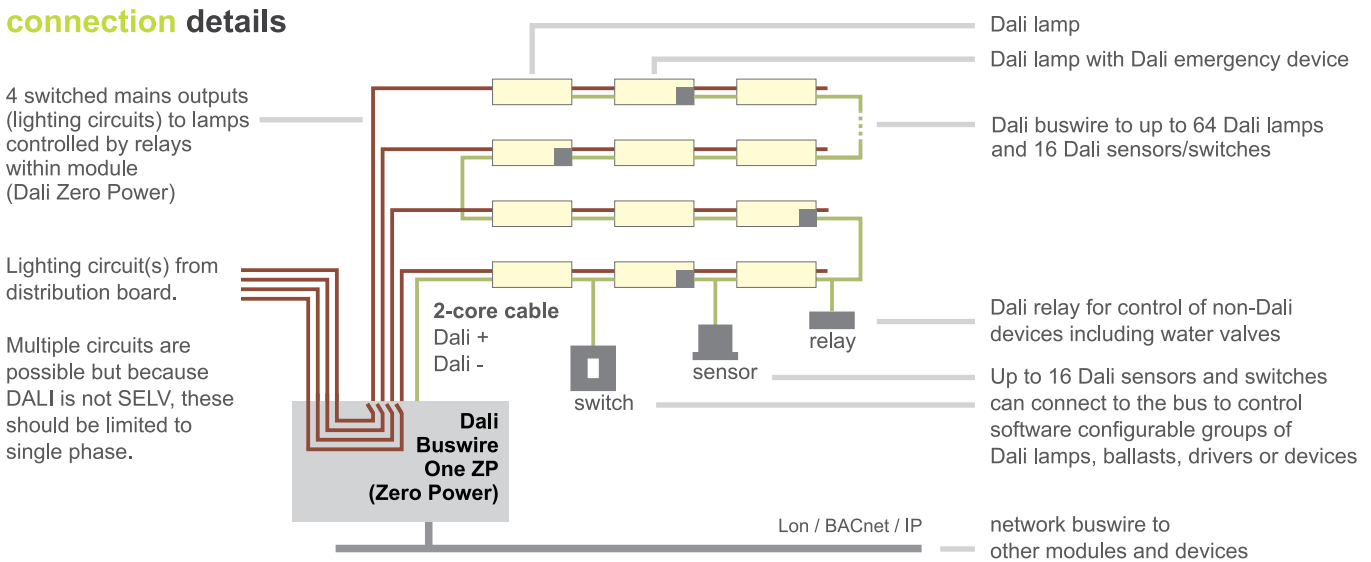
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## connection details



## technical details

### outputs

DALI buswire output controls up to sixty-four DALI ballasts/drivers.  
Four switched outputs (20A) switch 230V feed to lamps via mechanically-latched relays for Dali Zero Power

### Dali monitoring

Module monitors and displays individual lamp/ballast failure for up to sixty-four Dali devices.  
Module monitors individual Dali emergency lamps/devices and displays emergency lamp and device failures on an individual basis.

### Dali sensors, switches and emergency devices

Module accepts 16 DALI sensors, switches and switch interfaces on the Dali buswire plus Dali emergency devices .

### Dali bus connection

Four 2-pin ports for Dali bus connection (max 1.5 sq.mm cable): the four ports operate in parallel and relate to switched outputs 1, 2, 3 and 4.

### network Lon bus inputs

2 plug-in ports for twisted pair Lon network bus connection.

### buswire specification

for latest buswire specifications and cable lengths refer to Buswire Specification data sheet

### supply voltage

1 x 220-240V~ 50/60Hz single phase power supply to power module (or from incoming lighting circuit).

### diagnostic LEDs

Power LED - shows secondary power circuit operational.  
Alert LED - indicates short on the sensor bus or issue with Communication card.  
Wink LED - winks when instructed through software  
Service LED - indicates fault mode.

### construction

painted galvanised steel enclosure finished RAL 7035

### ambient temperature / relative humidity

0 to +50°C / 20% to 90% non condensing

### dimensions (mm)

200 w x 225 h x 70 d

## Lon specification



FT5000 Neuron and FTX3 transceiver conforms to LonMark 3.4 profiles:

16 switch objects	# 3200
16 light sensor objects	# 1010
16 occupancy sensor objects	# 1060
16 open-loop actuator objects	# 0003
16 occupancy controller objects	# 3071
16 light controller objects	# 3050

# DALI One Ten ZP module

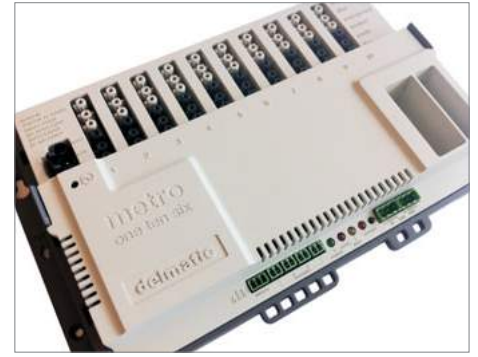
delmatic.com

product ref: 201B1

sheet 1/2

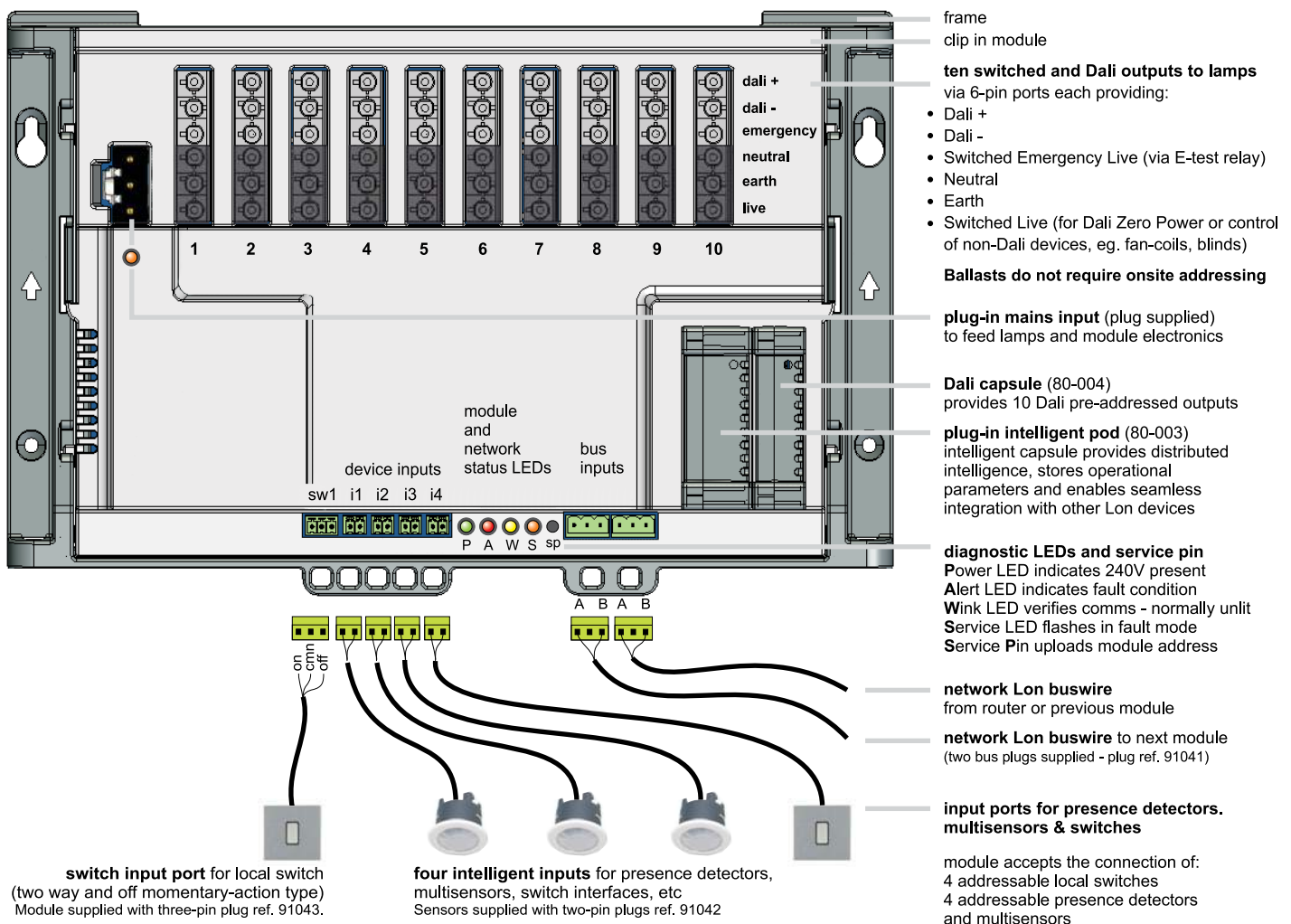
34

The module provides individual control and automatic addressing of ten DALI lamps and contains ten switching relays for DALI Zero Power and control of non-Dali devices including fan-coils and blinds.

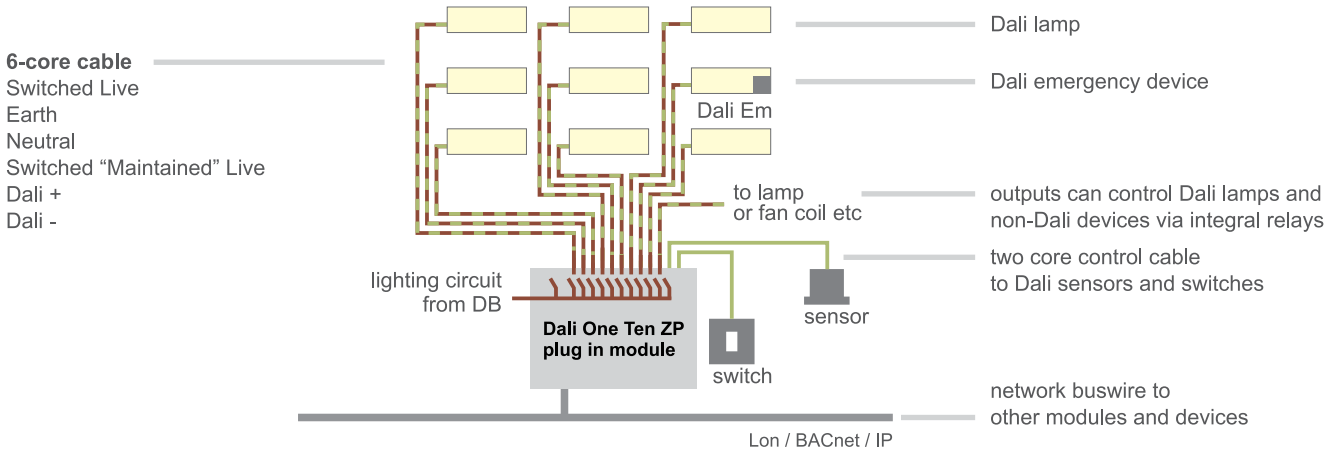


- 10 individually addressed DALI outputs
- 10 individually addressed 230V switched outputs via relays
- individual DALI lamp and ballast failure monitoring
- individual DALI emergency light testing and monitoring
- energy-efficient Dali Zero Power avoids standby energy consumption
- total plug-in connectivity for speed and convenience
- 6-pin ports provide switched 230V & DALI pair to each lamp
- Dali without addressing feature avoids on-site addressing of ballasts
- reduces time and cost of commissioning and simplifies maintenance
- designed for single or two-fix installation via wall-mount or drop-rods

## module features



## connection details



## technical details

### supply voltage

1 x 220-240V~ 50/60Hz single phase 10A lighting circuit protected by 10A MCB

### outputs

- 10 Dali outputs (ports are pre-addressed so ballasts do not require on-site addressing)
- 10 switched outputs (10A resistive, 3A inductive)
- 1 switched emergency test output for "maintained" live to all ports

### Dali monitoring

Module monitors individual lamp/ballast failure on each of the ten Dali outputs  
Module monitors individual Dali emergency lamp/device on each of the ten Dali outputs

### local switch inputs

- 1 plug-in port (3-pin - sw1) for connection of conventional monetary action switch
- 4 plug-in ports (2-pin - i1-i4) for connection of Dali sensors & switches (max 1 sq.mm cable).

### network Lon bus inputs

2 plug-in ports for twisted pair Lon network bus connection.

### buswire specification

for latest buswire specifications refer to Buswire Specification data sheet

### diagnostic LEDs

- Neon - shows 240v present.
- Power LED - shows secondary power circuit operational.
- Alert LED - indicates short on the sensor bus or issue with Communication card.
- Wink LED - winks when instructed through software
- Service LED - indicates fault mode.

### construction

flame-retardant low smoke moulded housing

### ambient temperature / relative humidity

0 to +50°C / 20% to 90% non condensing

### dimensions (mm)

345 w x 210 h x 55 d (excludes plugs) and 100 mm depth including capsule & plugs

## Lon specification



FT5000 Neuron and FTX3 transceiver conforms to LonMark 3.4 profiles:

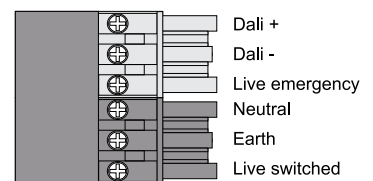
4 switch objects	# 3200
4 light sensor objects	# 1010
4 occupancy sensor objects	# 1060
12 open-loop actuator objects	# 0003
4 occupancy controller objects	# 3071
4 light controller objects	# 3050

## plug details

### output to lamps

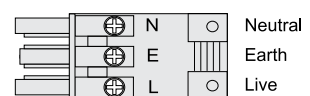
6 pole connector without locking device  
Wieland ref: 34.362.0211.1

Switched Live, Earth, Neutral,  
Switched Emergency Live,  
Dali +, Dali -



### mains input to module (plug supplied)

3 pole female plug with locking device  
(Live, Earth, Neutral)



# DALI Zero Twelve module

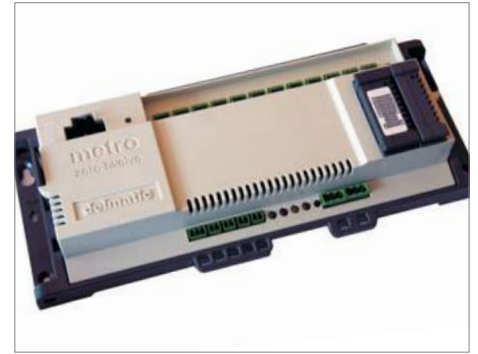
delmatic.com

product ref: 206A1

sheet 1/2

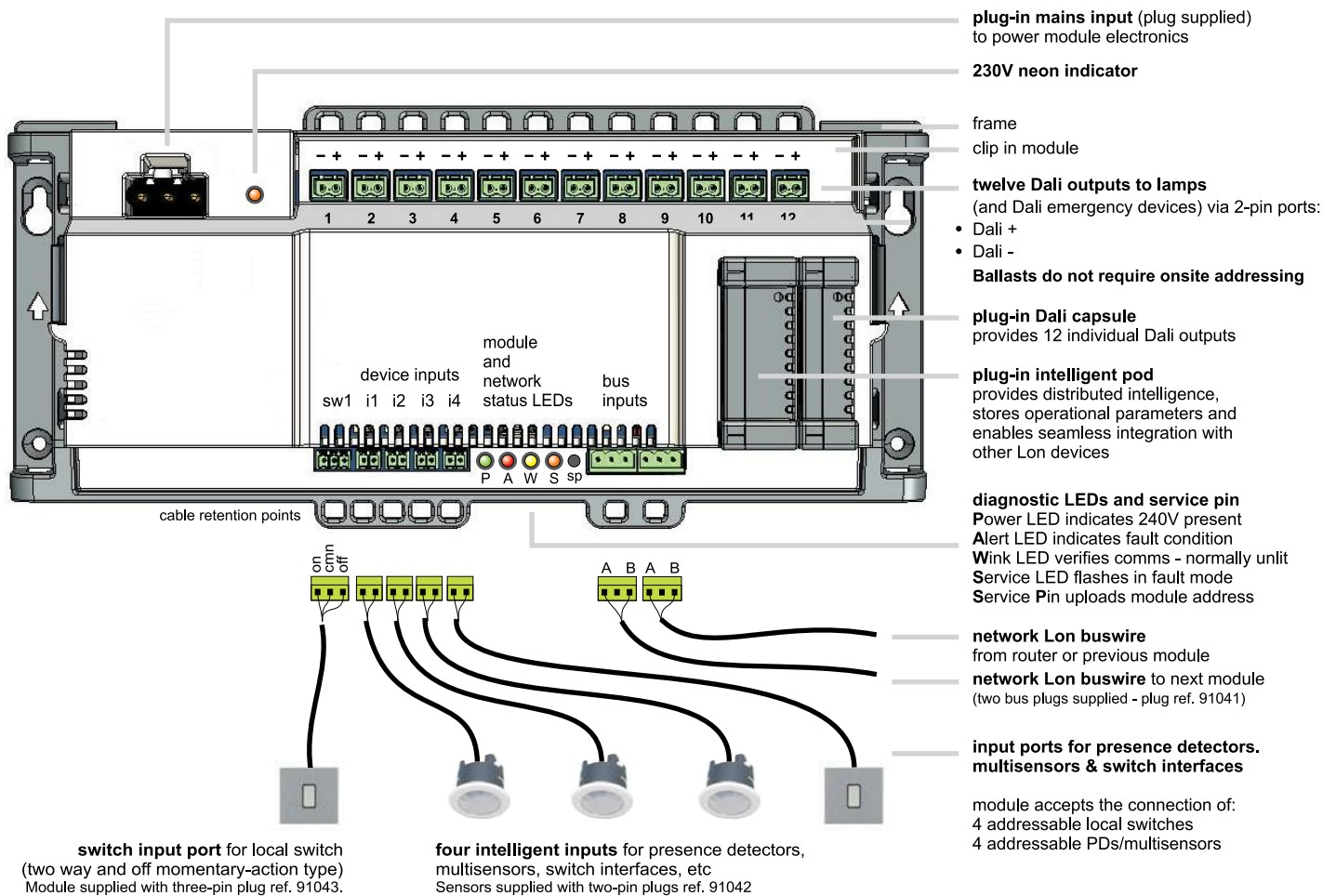
The module provides individual control and automatic addressing of twelve DALI lamps.

- 12 individually addressed DALI outputs
- individual DALI lamp and ballast failure monitoring
- individual DALI emergency light testing and monitoring
- total plug-in connectivity for speed and convenience
- 2-pin ports provide switched DALI pair to each lamp
- Dali without addressing feature avoids on-site addressing of ballasts
- reduces time and cost of commissioning and simplifies maintenance
- designed for single or two-fix installation via wall-mount or drop-rods



The module provides a DALI signal to each lamp while the mains supply is fed directly to the lamps and powers the module. Multiple power supplies to the lamps are possible but because DALI is not SELV they should be limited to single phase.

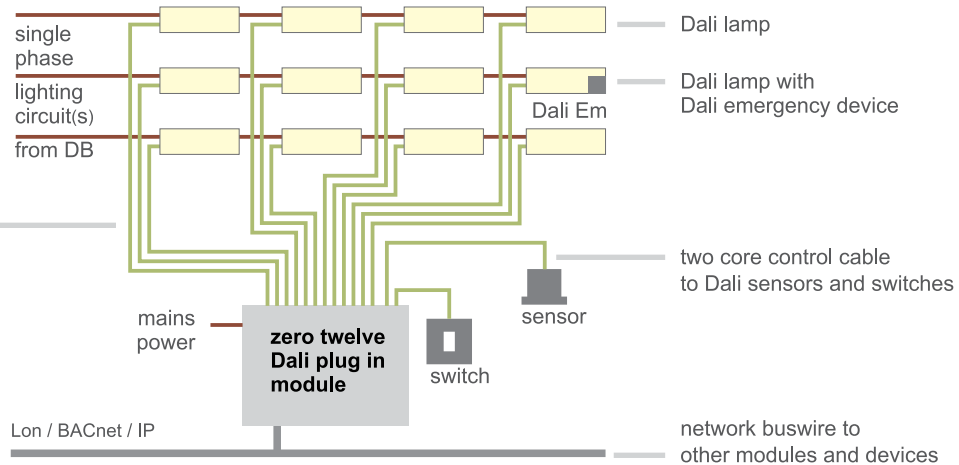
## module features



## connection details

Lighting circuit(s) wire direct to lamps from distribution board. Multiple circuits are possible but because DALI is not SELV should be limited to single phase.

**2-core cable**  
Dali +  
Dali -



## technical details

### supply voltage

1 x 220-240V~ 50/60Hz single phase power supply protected by fused spur

### outputs

mains supply to power lamps is wired direct from distribution board to lamps  
12 Dali outputs (ports are pre-addressed so ballasts do not require on-site addressing)

### Dali monitoring

Module monitors individual lamp/ballast failure on each of the twelve Dali outputs  
Module monitors individual Dali emergency lamp/device on each of the twelve Dali outputs

### emergency monitoring

Dali emergency monitoring devices can be connected to the Dali bus from each port and are individually addressed for emergency test and monitoring purposes.

### local switch inputs

1 plug-in port (3-pin - sw1) for connection of conventional monetary action switch  
4 plug-in ports (2-pin - i1-i4) for connection of Dali sensors & switches (max 1 sq.mm cable).

### network Lon bus inputs

2 plug-in ports for twisted pair Lon network bus connection.

### buswire specification

for latest buswire specifications refer to Buswire Specification data sheet

### diagnostic LEDs

Neon - shows 240v present.  
Power LED - shows secondary power circuit operational.  
Alert LED - indicates short on the sensor bus or issue with Communication card.  
Wink LED - winks when instructed through software  
Service LED - indicates fault mode.

### construction

flame-retardant low smoke moulded housing

### ambient temperature / relative humidity

0 to +50°C / 20% to 90% non condensing

### dimensions (mm)

345 w x 155 h x 60 d (100 mm depth including mains plug)

## Lon specification



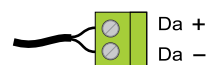
FT5000 Neuron and FTX3 transceiver conforms to LonMark 3,4 profiles:

4 switch objects	# 3200
4 light sensor objects	# 1010
4 occupancy sensor objects	# 1060
12 open-loop actuator objects	# 0003
4 occupancy controller objects	# 3071
4 light controller objects	# 3050

## plug details

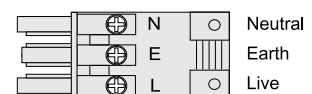
### DALI output to lamps (plug supplied)

(Dali - and Dali +)



### mains input to module (plug supplied)

3 pole female plug with locking device (Live, Earth, Neutral)



The module provides control of 240 DALI lamps across 12 DALI channels.

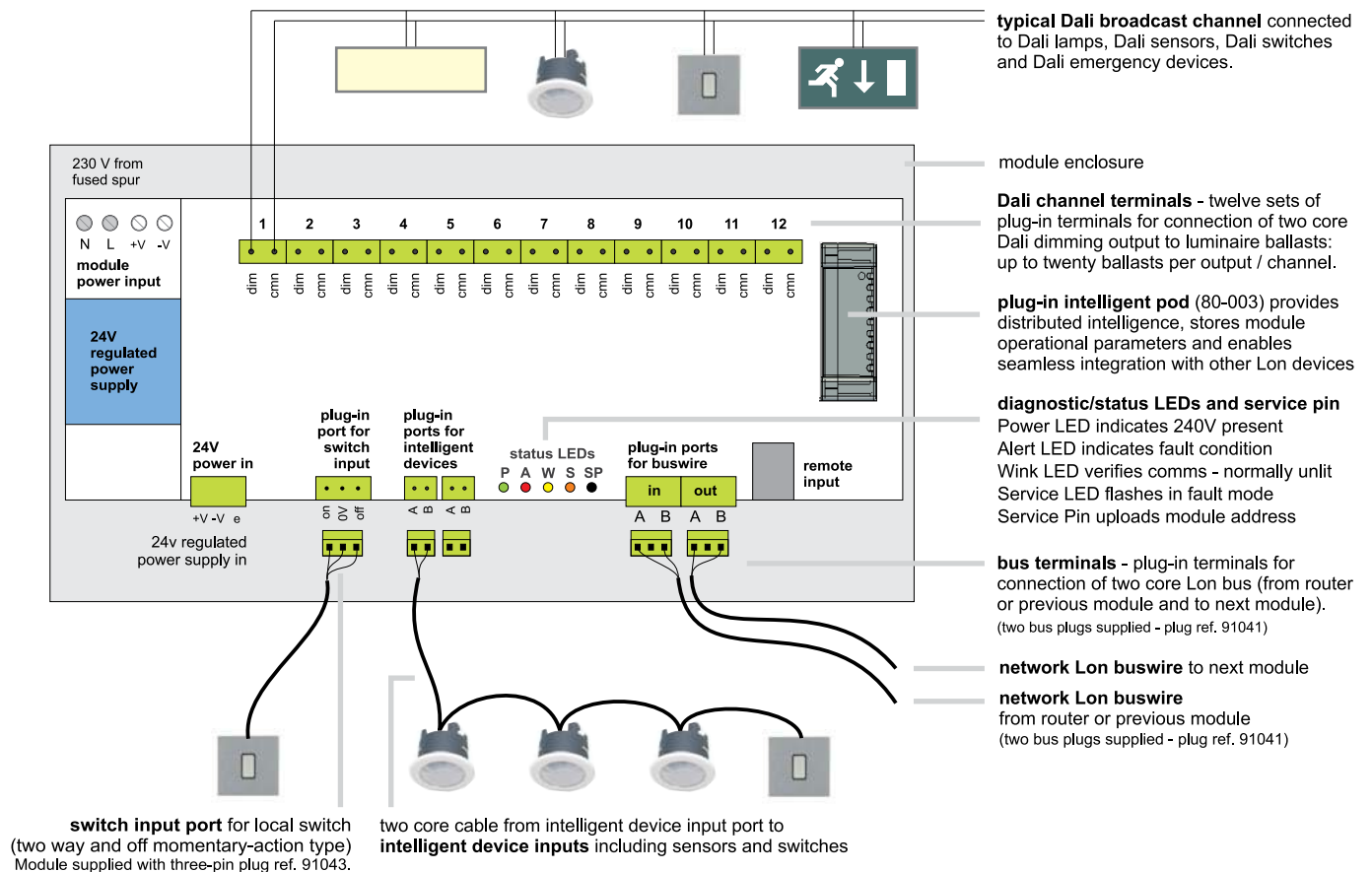
- 12 individually addressed DALI channel outputs
- 240 Dali lamps controlled as twelve DALI broadcast channels or groups
- DALI lamp and ballast failure monitored individually and displayed per channel
- individual DALI emergency light testing and monitoring per DALI device
- DALI sensors, switches and emergency devices connect to the DALI channels
- sensors/switches on a channel automatically control lamps on that channel
- DALI without addressing feature avoids on-site addressing of ballasts
- reduces time and cost of commissioning and simplifies maintenance



The mains supply is fed directly to the lamps and powers the module: the module provides an individual DALI broadcast signal to each channel.

DALI sensors and switches connected to a channel automatically control lamps on that channel. If lamps on more than one DALI channel are to be controlled by the same local device, the device should be connected to the Intelligent device port.

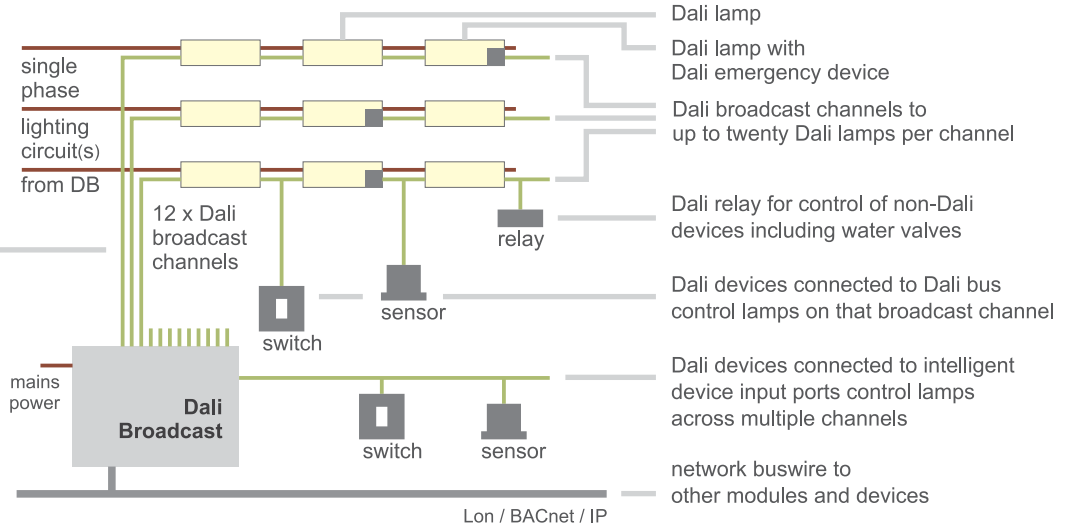
## module features



## connection details

Lighting circuit(s) wire direct to lamps from distribution board. Multiple circuits are possible but because DALI is not SELV should be limited to single phase.

**2-core cable**  
Dali +  
Dali -



## technical details

### outputs

Mains supply to power lamps is wired direct from distribution board to lamps.  
12 DALI broadcast channels feed up to twenty DALI ballasts per channel.  
Channel ports are pre-addressed so ballasts do not require on-site addressing.

### Dali monitoring

Module monitors individual lamp/ballast failure on each of the twelve DALI channels and displays lamp failures on a channel basis.  
Module monitors individual Dali emergency lamps/devices on each of the twelve Dali outputs and displays emergency lamp and device failures on an individual basis.

### Dali sensors, switches and emergency devices

Module accepts DALI sensors, switches, switch interfaces and Dali emergency devices on each of the twelve channels.  
DALI sensors and switches connected to the two-core DALI channel bus control DALI lighting on that channel (max 1 sq.mm cable).  
DALI emergency monitoring devices connect to any Dali channel bus and are individually monitored.

### Module incorporates input ports for intelligent devices

DALI sensors and switches connected to these ports can be configured to control lamps across multiple broadcast channels.  
Intelligent device input port accepts connection of up to 16 DALI switches/sensors (max 1 sq.mm cable with maximum 100m length).

### local switch inputs

- 1 plug-in port (3-pin) for connection of conventional monetary action switch
- 2 plug-in ports (2-pin) for connection of intelligent devices including Dali sensors & switches

### network Lon bus inputs

- 2 plug-in ports for twisted pair Lon network bus connection.

### buswire specification

for latest buswire specifications and cable lengths refer to Buswire Specification data sheet

### supply voltage

- 1 x 220-240V~ 50/60Hz single phase power supply.

### diagnostic LEDs

- Power LED - shows secondary power circuit operational.
- Alert LED - indicates short on the sensor bus or issue with Communication card.
- Wink LED - winks when instructed through software
- Service LED - indicates fault mode.

## Lon specification



FT5000 Neuron and FTX3 transceiver conforms to LonMark 3.4 profiles:

12 switch objects	# 3200
12 light sensor objects	# 1010
12 occupancy sensor objects	# 1060
12 open-loop actuator objects	# 0003
12 occupancy controller objects	# 3071
12 light controller objects	# 3050

### construction

painted galvanised steel enclosure finished RAL 7035

### ambient temperature / relative humidity

0 to +50°C / 20% to 90% non condensing

### dimensions (mm)

330 w x 190 h x 70 d

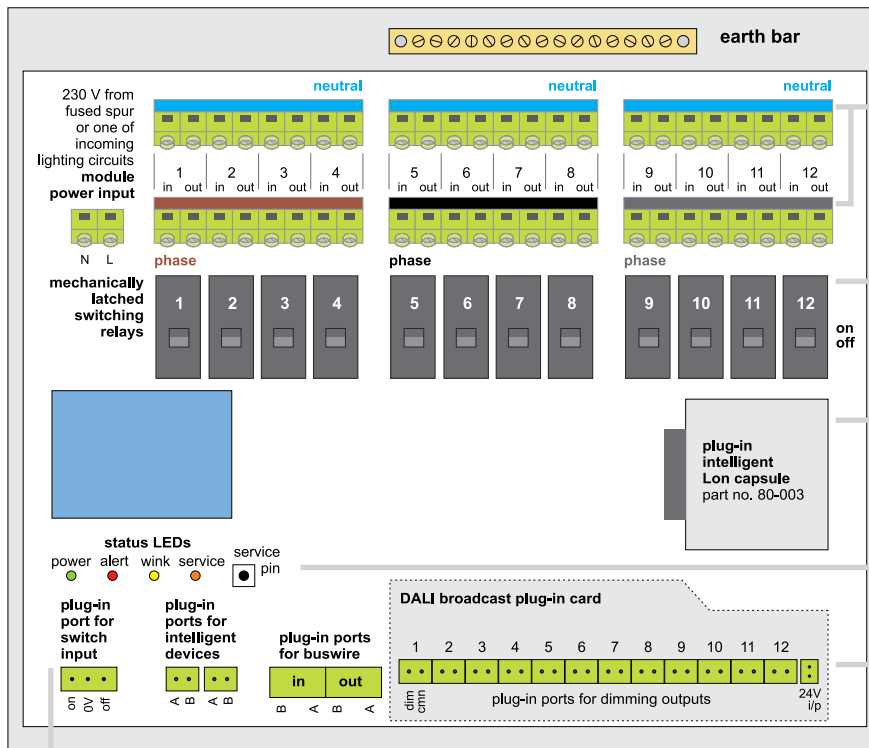
# DALI Broadcast ZP module

The module provides broadcast control of 12 Dali channels and provides energy-optimised Dali Zero Power switching of up to 12 lighting circuits feeding the lamps.

- 12 individually addressed DALI broadcast outputs
- 12 DALI Zero Power switched outputs avoids standby power consumption
- DALI lamp and ballast failure monitored individually and displayed per channel
- individual DALI emergency light testing and monitoring per DALI device
- fascia override switches enable manual on/off override of each relay output
- sensors and switches connect to intelligent buswire cable or DALI channel
- DALI without addressing feature avoids on-site addressing of ballasts
- reduces the time and cost of commissioning and simplifies maintenance



## module features



robust, painted, galvanised steel enclosure with keyhole fixing for ease of mounting and quick-lock lid

mains termination zone for connection of incoming circuit Live & Neutral cables, and Neutral & Switched Live outputs to luminaires

twelve 20A mechanically-latched relays with on/off status indication and manual override - in the event of electronics failure relays maintain their last state and may be manually operated on and off from override switches accessible through the module lid

plug-in intelligent pod (80-003) provides distributed intelligence, stores module operational parameters and enables seamless integration with other Lon devices

diagnostic/status LEDs and service pin  
 Power LED indicates 240V present  
 Alert LED indicates fault condition  
 Wink LED verifies comms - normally unlit  
 Service LED flashes in fault mode  
 Service Pin uploads module address

DALI Broadcast card provides twelve DALI Broadcast dimming outputs: each channel can connect to up to twenty DALI lamps/ballasts/drivers

DALI broadcast channel 1 (typical) - two core DALI bus (polarity insensitive) to lamps.

DALI Zero Power 230V output is taken from associated relay output terminals

network Lon buswire to next module

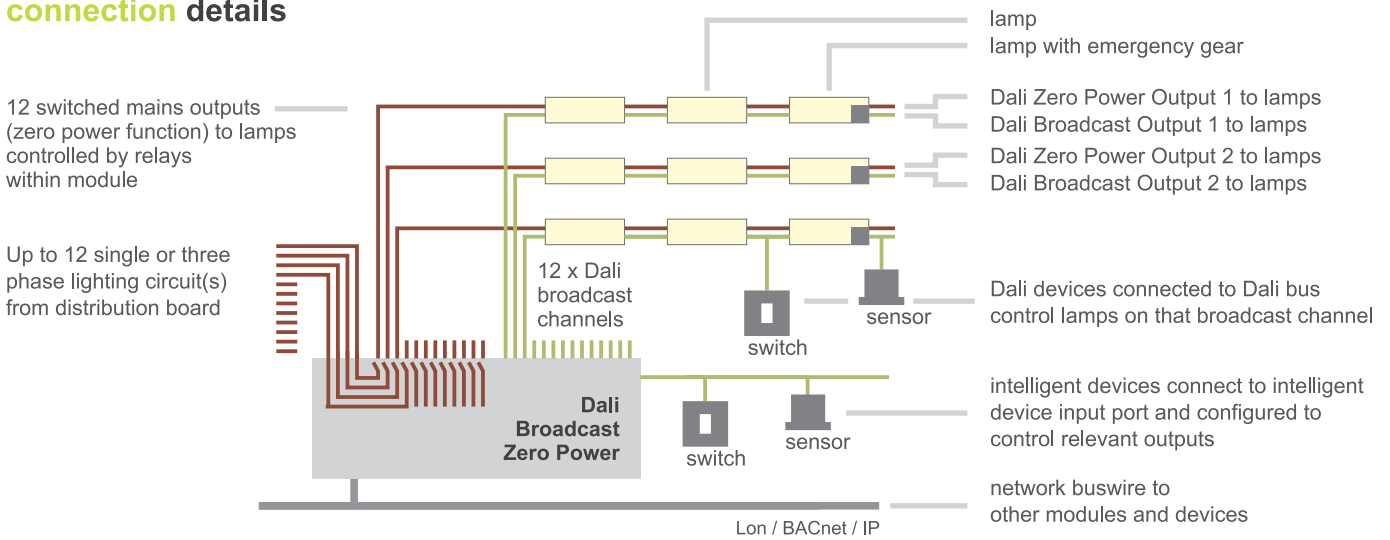
network Lon buswire from router or previous module (two bus plugs supplied - plug ref. 91041)

switch input port for local switch (two way and off momentary-action type)  
 Module supplied with three-pin plug ref. 91043.

two core cable from intelligent device input port to intelligent device inputs including sensors and switches



## connection details



## technical details

### outputs

12 DALI broadcast channels feed up to twenty DALI ballasts per channel. Channel ports are pre-addressed so ballasts do not require on-site addressing.

12 DALI Zero Power Outputs 220-240V~50/60 Hz x 20 Amp single / three phase circuits: terminals accept 2 x 4 sq.mm cables

### Dali monitoring

Module monitors individual lamp/ballast failure on each of the twelve DALI channels and displays lamp failures on a channel basis.

Module monitors individual Dali emergency lamps/devices on each of the twelve Dali outputs and displays emergency lamp and device failures on an individual basis.

Module accepts DALI sensors, switches, switch interfaces and Dali emergency devices on each of the twelve channels.

DALI sensors and switches connected to the two-core DALI channel bus control DALI lighting on that channel (max 1 sq.mm cable).

DALI emergency monitoring devices connect to any Dali channel bus and are individually monitored.

### Module incorporates input ports for intelligent devices

DALI sensors and switches connected to these ports can be configured to control lamps across multiple broadcast channels.

Intelligent device input port accepts connection of up to 16 DALI switches/sensors (max 1 sq.mm cable with maximum 100m length).

### local switch inputs

1 plug-in port (3-pin) for connection of conventional monetary action switch

1 plug-in port (2-pin) for connection of intelligent devices including Dali sensors & switches (max 1 sq.mm cable).

### network Lon bus inputs

2 plug-in ports for twisted pair Lon network bus connection.

### buswire specification

for latest buswire specifications and cable lengths refer to Buswire Specification data sheet

### diagnostic LEDs

Power LED - shows secondary power circuit operational.

Alert LED - indicates short on the sensor bus or issue with Communication card.

Wink LED - winks when instructed through software

Service LED - indicates fault mode.

## Lon specification



FT5000 Neuron and FTX3 transceiver conforms to LonMark 3.4 profiles:

12 switch objects	# 3200
12 light sensor objects	# 1010
12 occupancy sensor objects	# 1060
12 open-loop actuator objects	# 0003
12 occupancy controller objects	# 3071
12 light controller objects	# 3050

### construction

painted galvanised steel enclosure finished RAL 7035

### ambient temperature / relative humidity

0 to +50°C / 20% to 90% non condensing

### dimensions (mm)

330 w x 380 h x 70 d

# Six Six switching module

product ref: 210A1

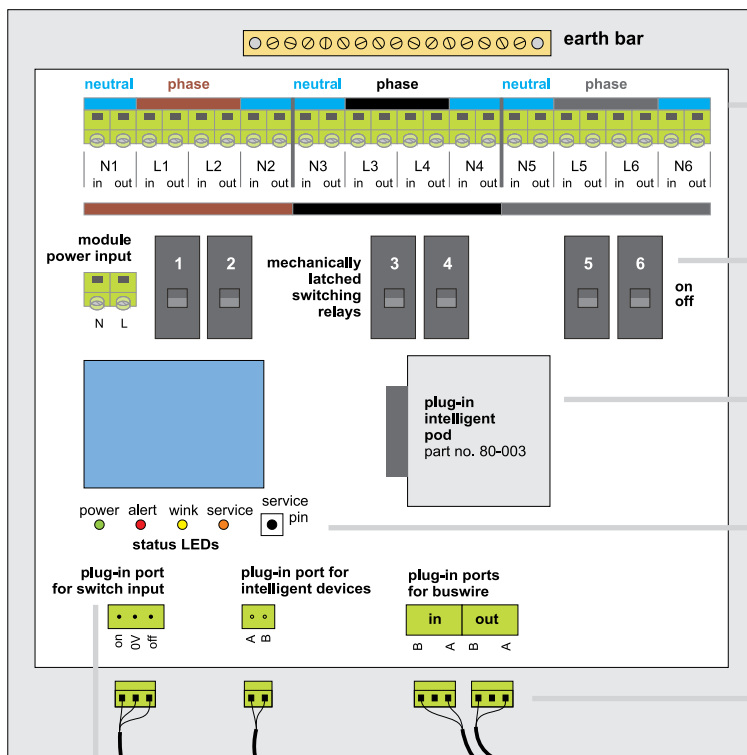
sheet 1/2

The **six six** module provides flexible addressable control of single & three-phase lighting and power circuits.

- 6 individually addressed 20A switching outputs
- accepts up to six incoming circuits
- equipped with six 20A switching relays to control lighting or power circuits
- any relay may be configured to operate as an emergency test output
- fascia override switches enable manual on/off override of each relay output
- sensors and switches connect to a shared intelligent buswire cable
- module comprises a fully-assembled unit comprising robust enclosure; mother board with terminals for live, neutral & earth cables, bus & local switch connections; and plug-in intelligent pod.



## module features



robust, painted, galvanised steel **enclosure** with **keyhole fixing** for ease of mounting and quick-lock lid

**mains termination zone** for connection of incoming circuit Live & Neutral cables, and Neutral & Switched Live outputs to luminaires

**six 20A mechanically-latched relays** with on/off status indication and manual override - in the event of electronics failure relays maintain their last state and may be manually operated on and off from **override switches** accessible through the module lid

**plug-in intelligent pod** (80-003) provides distributed intelligence, stores module operational parameters and enables seamless integration with other Lon devices

**diagnostic/status LEDs and service pin**  
 Power LED indicates 240V present  
 Alert LED indicates fault condition  
 Wink LED verifies comms - normally unlit  
 Service LED flashes in fault mode  
 Service Pin uploads module address

**bus terminals** - plug-in terminals for connection of two core Lon bus (polarity insensitive) in from router or previous module and out to next module

(two bus plugs supplied - plug ref. 91041)

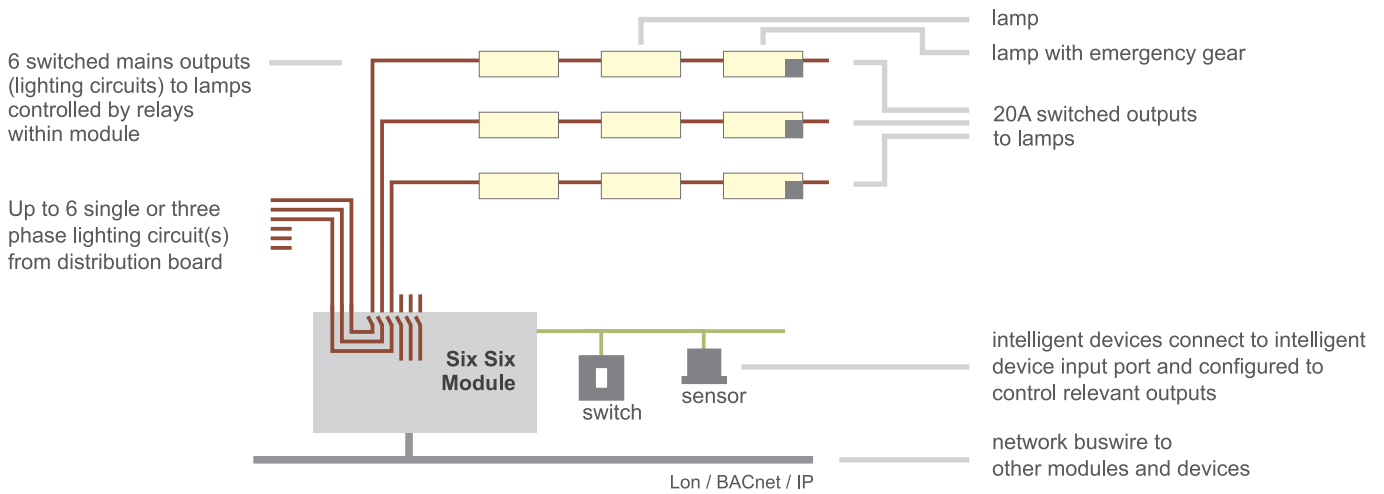
**network Lon buswire** to next module

**network Lon buswire** from router or previous module  
 (two bus plugs supplied - plug ref. 91041)

**switch input port** for local switch (two way and off momentary-action type)  
 Module supplied with three-pin plug ref. 91043.

two core cable from intelligent device input port to **intelligent device inputs** including sensors and switches

## connection details



## technical details

### mains input

six 220-240V~50/60 Hz x 20 Amp single / three phase circuits:  
terminals accept 2 x 4 sq.mm cables

### module power

module electronics powered from separate terminals: power may be taken from one of the incoming circuits

### mains outputs

six individually addressed switched outputs via mechanically latched relay with status indication & manual override: loading per circuit 20A.  
terminals accept 2 x 4 sq.mm cables

### local switch inputs

- 1 plug-in port (3-pin) for connection of conventional monetary action switch
- 1 plug-in port (2-pin) for connection of intelligent devices including Dali sensors & switches (max 1 sq.mm cable).

### network bus inputs

2 plug-in ports for twisted pair network bus connection.

### buswire specification

for latest buswire specifications and cable lengths refer to Buswire Specification data sheet

### diagnostic LEDs

- Power LED - shows secondary power circuit operational.
- Alert LED - indicates short on the sensor bus or issue with Communication card.
- Wink LED - winks when instructed through software
- Service LED - indicates fault mode.

### construction

painted galvanised steel enclosure finished RAL 7035

### ambient temperature / relative humidity

0 to +50°C / 20% to 90% non condensing

### dimensions (mm)

250 w x 250 h x 70 d

## Lon specification



FT5000 Neuron and FTX3 transceiver conforms to LonMark 3.4 profiles:

6 switch objects	# 3200
6 light sensor objects	# 1010
6 occupancy sensor objects	# 1060
6 open-loop actuator objects	# 0003
6 occupancy controller objects	# 3071
6 light controller objects	# 3050

# Twelve Twelve switching module

product ref: 202A1

sheet 1/2

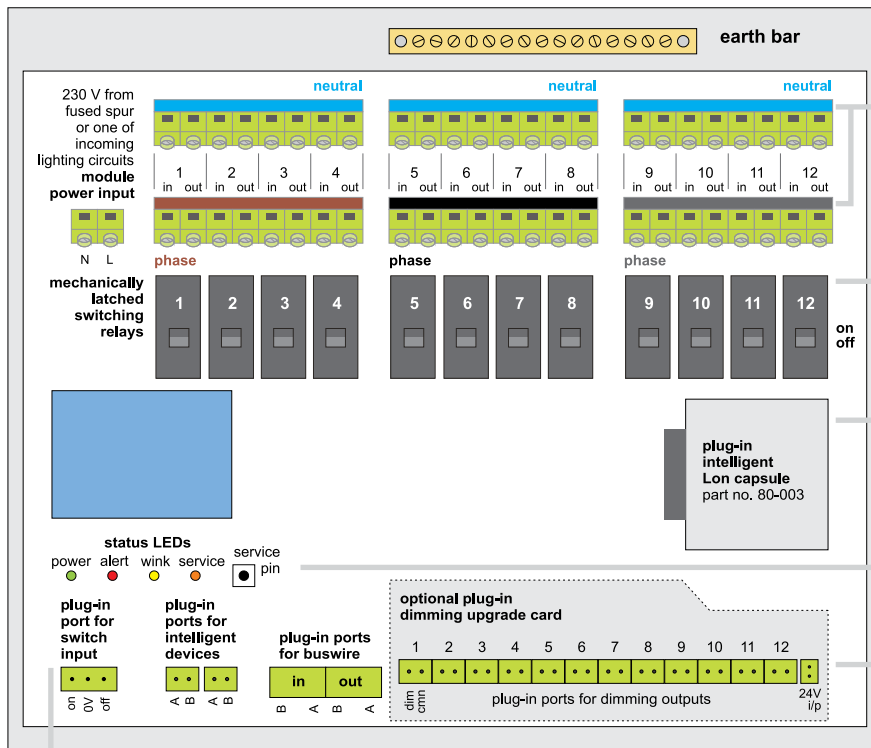
44

The **twelve twelve** module provides flexible addressable control of single & three-phase lighting and power circuits.

- 12 individually addressed 20A switching outputs
- accepts up to twelve incoming circuits
- equipped with twelve 20A switching relays to control lighting or power circuits
- any relay may be configured to operate as an emergency test output
- fascia override switches enable manual on/off override of each relay output
- sensors and switches connect to a shared intelligent buswire cable
- module comprises a fully-assembled unit comprising robust enclosure; mother board with terminals for live, neutral & earth cables, bus & local switch connections; and plug-in intelligent pod
- accepts plug-in upgrade card for analogue 1-10V or digital Dali dimming



## module features



robust, painted, galvanised steel enclosure with keyhole fixing for ease of mounting and quick-lock lid

mains termination zone for connection of incoming circuit Live & Neutral cables, and Neutral & Switched Live outputs to luminaires

twelve 20A mechanically-latched relays with on/off status indication and manual override - in the event of electronics failure relays maintain their last state and may be manually operated on and off from override switches accessible through the module lid

plug-in intelligent pod (80-003) provides distributed intelligence, stores module operational parameters and enables seamless integration with other Lon devices

diagnostic/status LEDs and service pin  
 Power LED indicates 240V present  
 Alert LED indicates fault condition  
 Wink LED verifies comms - normally unlit  
 Service LED flashes in fault mode  
 Service Pin uploads module address

optional plug-in dimming card provides twelve analogue (type 80-007) or digital (type 80-006) dimming outputs: contains terminals for connection of two core output to luminaire dimming ballasts

bus terminals - plug-in terminals for connection of two core Lon bus (polarity insensitive) in from router or previous module and out to next module  
 (two bus plugs supplied - plug ref. 91041)

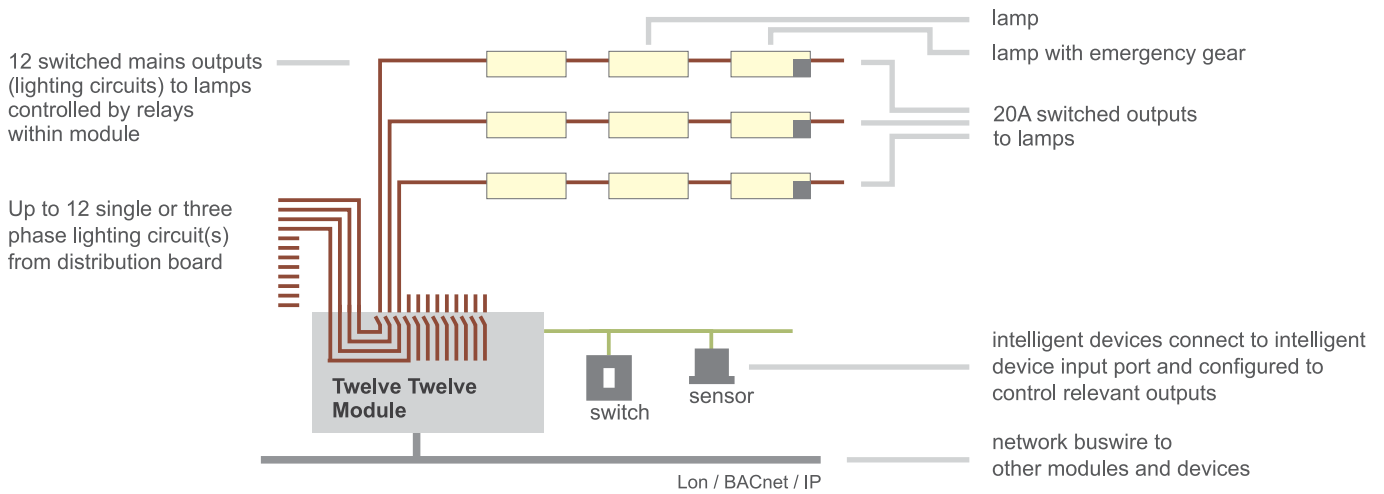
network Lon buswire to next module

network Lon buswire from router or previous module  
 (two bus plugs supplied - plug ref. 91041)

switch input port for local switch (two way and off momentary-action type)  
 Module supplied with three-pin plug ref. 91043.

two core cable from intelligent device input port to intelligent device inputs including sensors and switches

## connection details



## technical details

### mains input

twelve 220-240V~50/60 Hz x 20 Amp single / three phase circuits:  
terminals accept 2 x 4 sq.mm cables

### module power

module electronics powered from separate terminals: power may be taken from one of the incoming circuits

### mains outputs

twelve 20A individually addressed switched outputs via mechanically latched relay with status indication & manual override: loading per circuit 20A.  
terminals accept 2 x 4 sq.mm cables

### local switch inputs

1 plug-in port (3-pin) for connection of conventional monetary action switch  
1 plug-in port (2-pin) for connection of intelligent devices including Dali sensors & switches (max 1 sq.mm cable).

### network Lon bus inputs

2 plug-in ports for twisted pair Lon network bus connection.

### buswire specification

for latest buswire specifications and cable lengths refer to Buswire Specification data sheet

### diagnostic LEDs

Power LED - shows secondary power circuit operational.  
Alert LED - indicates short on the sensor bus or issue with Communication card.  
Wink LED - winks when instructed through software  
Service LED - indicates fault mode.

### construction

painted galvanised steel enclosure finished RAL 7035

### ambient temperature / relative humidity

0 to +50°C / 20% to 90% non condensing

### dimensions (mm)

330 w x 380 h x 70 d

### weight

4.4 kg

## Lon specification



FT5000 Neuron and FTX3 transceiver conforms to LonMark 3.4 profiles:

12 switch objects	# 3200
12 light sensor objects	# 1010
12 occupancy sensor objects	# 1060
12 open-loop actuator objects	# 0003
12 occupancy controller objects	# 3071
12 light controller objects	# 3050

# DALI One Relay

product ref: 208A1

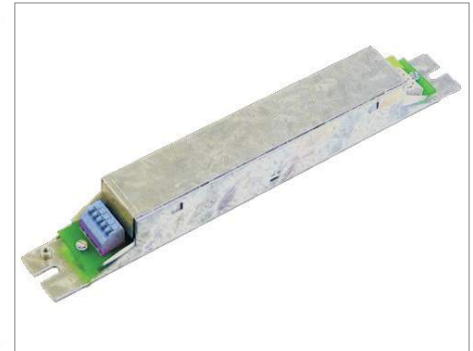
46

The **dali one relay** provides addressable control of non-Dali lamps and other devices such as fan-coils, blinds, water valves etc within a Dali environment.

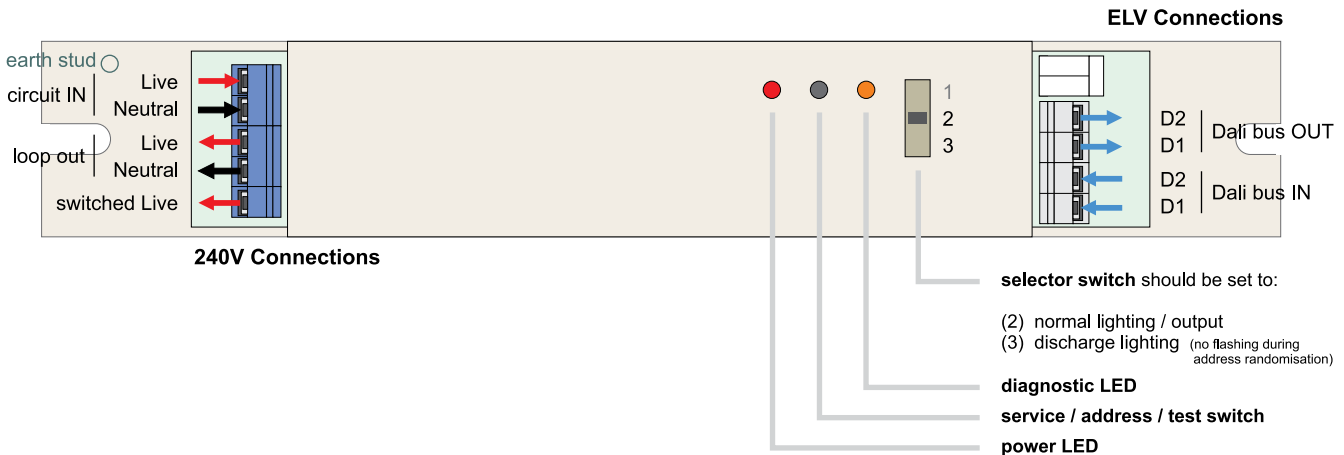
The unit is typically used in applications where the majority of controlled lights are Dali and yet certain luminaires are not available with Dali ballasts but need to be switched, or where other devices such as water valves, VAV units or window blinds require to be controlled.

The **dali one relay** connects to the Dali buswire which links Dali luminaires, sensors and other devices to the Dali control module: the 16A mechanically-latched relay operates in response to commands transmitted along the Dali bus.

The unit derives its power from the incoming 230V circuit. Integral LEDs indicate power & diagnostic functions while a selector switch configures the relay for control of normal lighting or discharge lighting (inhibiting frequent switching).



## features



## connection

The **dali one relay** is compatible with the complete range of Delmatic Dali control modules. The unit may connect to:

- the Dali bus from the **Dali Buswire module** which connects to Dali luminaires and Dali devices,
- the Dali bus on any or all of the twelve channels from the **Dali Broadcast module**,
- Dali outputs from the **Zero Twelve Dali plug-in module**.

## technical details

### supply

1 x 220-240V~ 50/60Hz single phase 10A lighting circuit

### switched output

1 x 16A switched output (max 1.5 sq.mm cable)

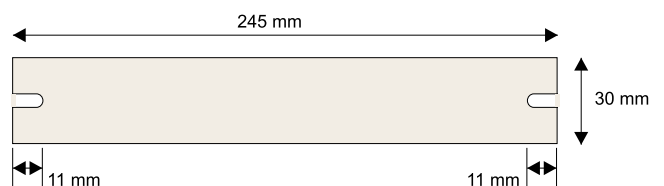
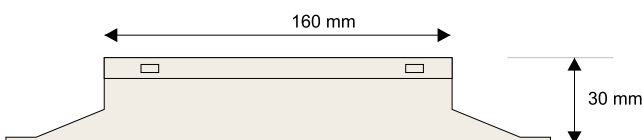
### Dali bus inputs

2 plug-in ports (two-pin) for bus connection (max 1.5 sq.mm cable)

### construction / ambient temp / relative humidity

metal enclosure / 0 to +50°C / 20% to 90% non condensing

## dimensions and mounting details



# RS232 / 485 / DMX interface

delmatic.com

product ref: 215A1 - RS 232 interface

sheet 1/1

product ref: 216A1 - DMX (485) interface

The RS 232 / 485 / DMX interface unit seamlessly interfaces the lighting control network with other devices via RS 232, RS 485 or DMX protocols.

In RS 232 mode, the unit receives and transmits signals between the lighting management network and systems such as AV controls. Scenes initiated by the AV system are received by the interface and activate preset lighting scenes & moods: scenes selected from Delmatic scene-set panels, infra-red transmitters, touchpads & touchpanels route via the interface to trigger audio visual functions.

In DMX mode, the interface provides integrated control of DMX light sources enabling DMX lighting in front-of-house areas and building façades etc to be controlled as part of the lighting management network, activated by switches, sensors and scene-set panels and configurable through the graphical software.



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## technical details

<b>supply</b>	1 x 220-240V~ 50/60 Hz single phase circuit to power module. (3 pin plug-in mains input connector supplied)
<b>protection</b>	module requires external protection by 10A MCB.
<b>RS232 interface</b>	9,600 Baud (maximum 57,600 Baud) ASCII protocol. one D-type port for RS232 connection.
<b>RS485 interface</b>	9,600 Baud (maximum 57,600 Baud) ASCII protocol. one 3-pin port for RS485 connection (max. 1.5 sq.mm cable).
<b>DMX interface</b>	250,000 Baud. one 3-pin port for DMX connection (max. 1.5 sq.mm cable).
<b>buswire specification</b>	for latest buswire specifications and cable lengths refer to Buswire Specification data sheet

### dimensions (mm)

225 w x 133 h x 66 d

100mm depth including mains plug

### construction

flame-retardant low smoke moulded housing

### ambient temperature / relative humidity

0 to +50°C / 20% to 90% non condensing

### mounting

The module is designed for wall or soffit mounting using four M5 screw fixings or two 8mm droprods.

### Lon specifications

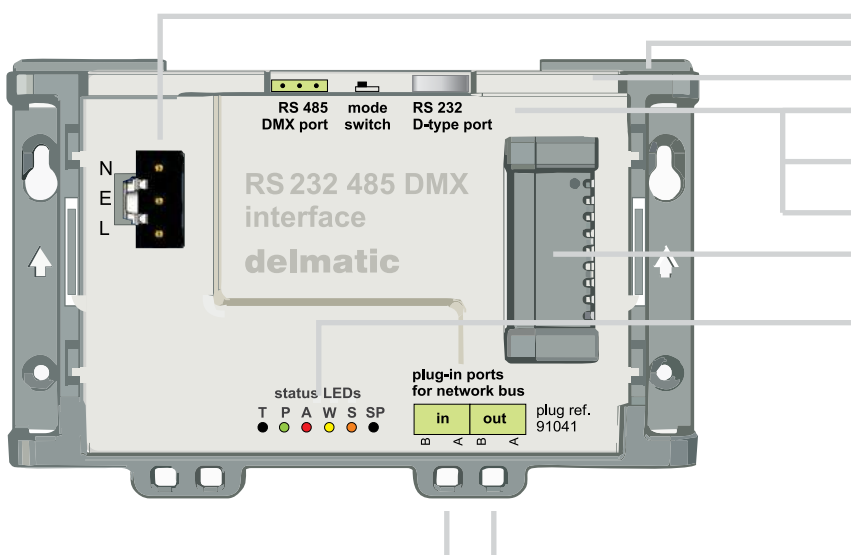
Echelon LonWorks FT5000 Neuron

FTX3 free topology transceiver

64kb EEPROM

Conforms to LonMark 3.4 guidelines and profiles

## module features



### plug-in mains input (plug supplied with module)

first-fix frame

clip in module

### DMX / RS485 port

3-pin port for DMX connection (max 1.5 sq.mm cable).

### RS 232 port

one D-type port for RS232 connection.

**mode switch** selects RS232 or RS485/DMX mode

**plug-in intelligent pod (80-003)** provides distributed intelligence, stores operational parameters & enables seamless integration with other Lon devices

### diagnostic LEDs and service pin

**Test pin** initiates test functions

**Power LED** - indicates module is powered up

**Alert LED** - bicolour LED indicate status and comms

**Wink LED** - winks when instructed by software

**Service LED** - lights when service pin pressed and flashes if module has no application software

**SP service pin** - uploads module address

**Lon bus** - plug-in terminals for connection of two core bus (from router or previous module & to next module).

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Delmatic's **Smart IP Router** forms part of a site-wide lighting management and integrated building system, and optimises data transmission across the network.

The Smart IP Router is a versatile device that connects Lon devices to IP-based applications, and incorporates built-in drivers for LonWorks and LNS Remote Network Interface as well as Modbus, M-Bus, and SOAP/XML.

The Smart IP Router is easy to configure & manage using Delmatic Lightscape™ software as well as on-board web pages. The router includes remote back-up and restore features, remote firmware upgrades, automatic device discovery, configuration & commissioning, and access to master control, load-shedding and emergency-test routines, as well as monitoring functions: the router also accepts direct digital inputs & provides digital output points.

Key-protected controls provide access to master on and off functions and emergency test routines as well as network monitoring status. The unit accepts the connection of a lap-top or hand-held device for local configuration and monitoring, includes integral network termination resistors and uses plug-in electronics for ease of upgrade and maintenance.

The Smart IP Router is supplied BACnet enabled and an optional software upgrade converts the router into a powerful LON BACnet device.



## features

<b>controls</b>	Service button, Reset button Master on / off control Emergency test start / stop control Network line resistance selector
<b>indicators</b>	Power On/Wink Ethernet link, Ethernet activity, 10/100 Mbps LonWorks Transmit and Receive activity Digital inputs Digital outputs Remote Network Interface connection status Emergency test active Service LED (node) and Service LED (router)
<b>ethernet port</b>	10/100BaseT, auto-selecting, auto polarity
<b>ethernet connector</b>	RJ-45, 8 conductor
<b>serial ports</b>	1 isolated RS-485 port: 1 EIA-232 port.
<b>digital inputs</b>	2 optically isolated dry contact inputs, 30V AC/DC
<b>relay outputs</b>	2 SPST relays rated 240VAC@10A or 24VDC@10A.



## technical details

### operating input voltage

100 - 240VAC (-6%/+10%), 50/60Hz

### power consumption

<15 watts

### operating temperature

0 to +50°C

### operating humidity

10 to 90% RH @ 50°C (non-condensing)

### dimensions

250 (w) x 150 (h) x 70 (d)

### housing/enclosure

painted galvanised steel enclosure finished RAL 7035

## network and device interfaces

- IP via built-in 10/100BaseT Ethernet interface
- TP/FT-10 free topology twisted pair
- ISO/IEC 14908-1 (LONWORKS) with built-in LON transceiver
- Modbus RTU with built-in RS-485 transceiver
- Modbus TCP (Modbus TCP/IP) with built-in Ethernet interface
- M-Bus with built-in RS-485 transceiver
- Custom drivers using built-in Ethernet, RS-232, & RS-485 interfaces

## user interfaces

The Smart IP Router is designed for local or remote configuration via:

- Delmatic's Lightscape Server and GUI Client software
- Built-in web pages for setup, network installation commissioning, scheduling, alarming, data logging, and network integration.

## standards-based protocols

- IP local and wide area networking protocols and Internet standards include TCP, IPv4, IPv6, PPP, CHAP, PAP, DHCP, DNS, FTP, ICMP, MD5, SMTP, SNMP, SNT, HTTP, HTTPS, and SSL.
- Additional IP application protocols: HTML, XML, SOAP, and DIME.
- NAT is supported

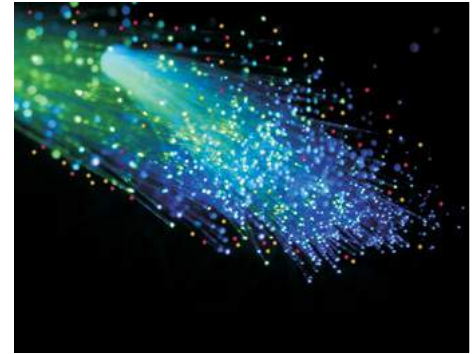
## IP-852 routing

- ISO/IEC 14908-4 (IP-852) routing of Lon over IP network
- IP-852 channel supports thousands of packets per second for high-performance monitoring and control

**Powerful LON BACnet software converts Delmatic's Smart IP Router into a robust Smart LON BACnet gateway device with comprehensive read and write abilities for up to 1000 Lon / BACnet data points.**

Compatible with all common BACnet AWS/OWS workstations, the unit acts as a BACnet Server and includes a BACnet browser, discovery and configuration tool, and complies with BACnet Interoperability Testing Services "BACnet Conformance Test Suite"

The gateway enables BACnet Clients (such as BACnet Operator Workstations) to read and write BACnet variables to the device. The Gateway allows the discovery of Lon data points as well as BACnet data points. The BACnet sector reads and writes to LON "Data Points" while the Lon sector enables the Gateway to fetch data from BACnet devices.



50



## features

The Lon BACnet software (product ref: 106SB1) converts the Delmatic Smart IP Router (product ref: 106S2) into a powerful Lon BACnet gateway.

The gateway provides a range of features including:

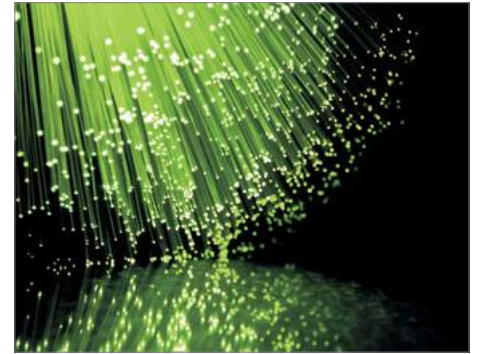
- Read Property and Read Property Multiple
- COV (Change of Value) reporting
- Fully discoverable by standard BACnet tools
- User Configurable BACnet Server
- User Configurable BACnet Client
- Supports BACnet Client and Server devices
- BACnet Support: ASHRAE BACnet 2010
- BACnet Configurator
  
- up to 1000 Lon / BACnet data points

Delmatic's **Router** forms part of the building-wide lighting management system architecture, ensures open and seamless communication across the horizontal and vertical networks and optimises the transmission of data.

Key-protected controls provide access to master on and off functions and emergency test routines as well as network monitoring status. The Router includes remote firmware upgrades, automatic device discovery, configuration and commissioning, and accepts direct digital inputs master on and off control, loadshedding and emergency-test functions.

The router accepts the connection of a lap-top or hand-held device for remote setting-up, configuring and monitoring of the network, and includes integral selectable network termination resistors.

A Smart IP router (with optional BACnet integration) is also available for transmission of lighting management data across the IP network.



## technical details

### controls

Service button, Reset button, Master on / off control, Emergency test start / stop control, Network line resistance selector

### indicators

Power On/Wink  
LonWorks Transmit and Receive activity  
Remote Network Interface connection status  
Emergency test active  
Service LED (node) and Service LED (router)

### digital inputs

2 dry contact inputs, 30V AC/DC

### relay outputs

2 signal relay outputs

### network capacity

supports up to 60 lighting control modules - an in-line Repeater may be used to increase the line capacity by a further 60 modules

### connectivity

connects to vertical network bus linking all routers via free-topology twisted pair cable.

connects to horizontal field bus linking up to 60 lighting control modules served by the router via a free-topology twisted pair cable.

### buswire specification

for latest specifications refer to Buswire Specification data sheet

### network cable length

500m (maximum total free topology without repeater)

### network connections

plug-in terminal connections - max cable size 1 sq.mm

### input voltage

100 - 240VAC (-6%/+10%), 50/60Hz

### power consumption

<5 watts

### ambient temperature

0 to +50°C

### operating humidity

0 to +50°C / 20% to 90% no condensation

### dimensions

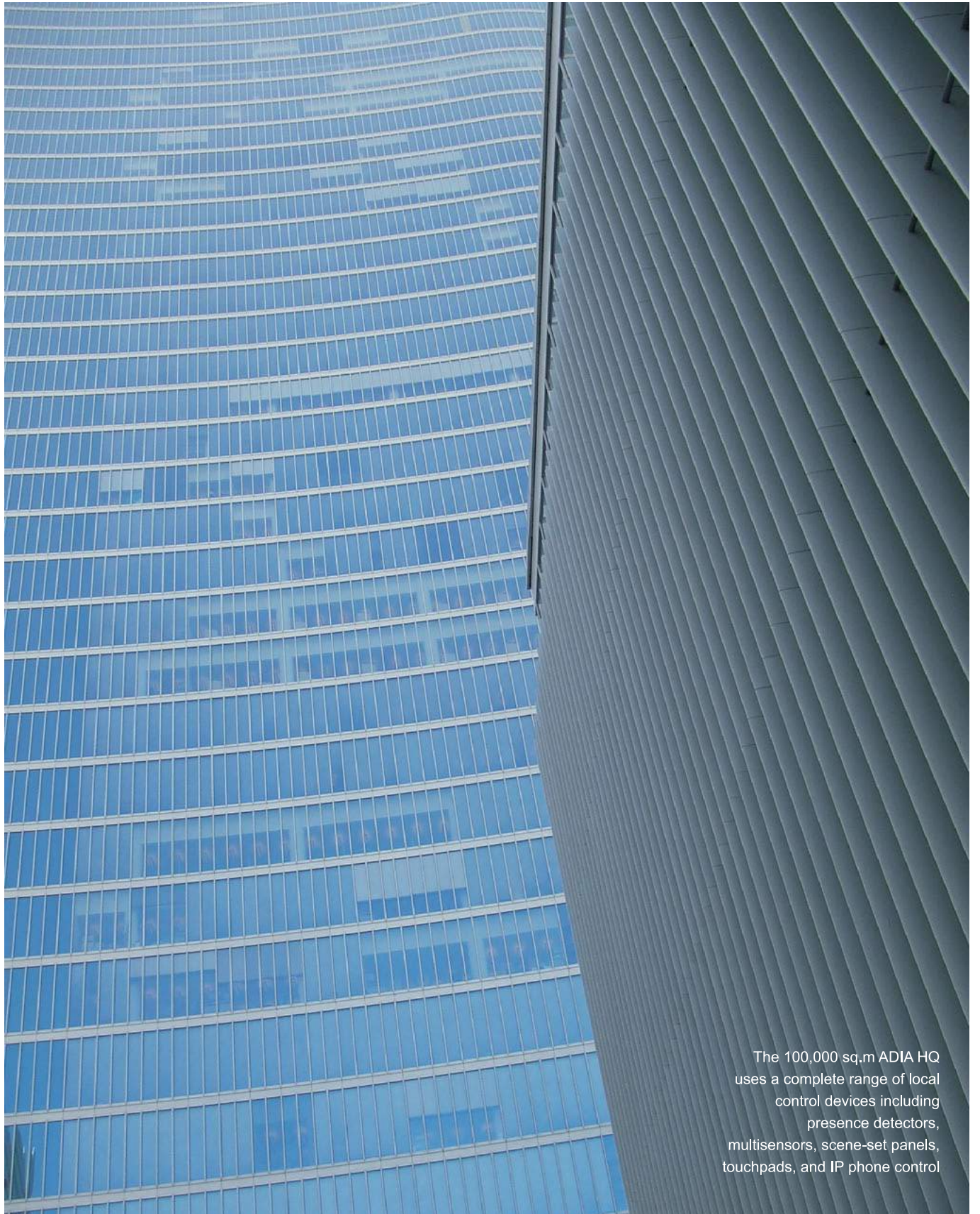
250 (w) x 150 (h) x 70 (d)

### housing/enclosure

painted galvanised steel enclosure finished RAL 7035

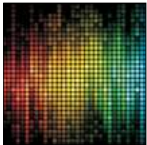








### Lon interface

protocol: ANSI/EIA 709.1-A-1999 (LonTalk protocol)  
transceiver: FTT-10A Transceiver  
network: polarity insensitive  
bus voltage: max 42.4 V DC

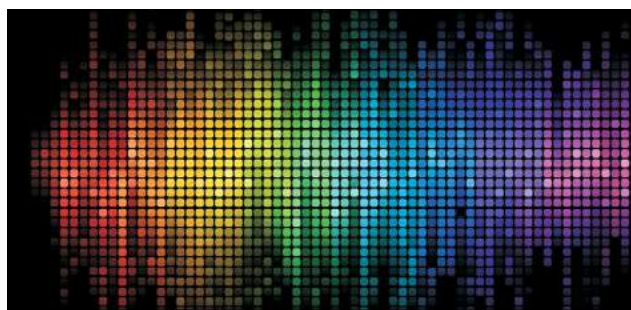


The 100,000 sq.m ADIA HQ uses a complete range of local control devices including presence detectors, multisensors, scene-set panels, touchpads, and IP phone control

Delmatic offer a wide range of local control devices which can be mixed and matched throughout a building and lighting management network.

	IP telephone control	page <b>54</b>
	web browser control	page <b>54</b>
	personal transmitter	page <b>55</b>
	touchpanel	page <b>56</b>
	touchpad	page <b>57</b>
	scene set panels	page <b>58</b>
	presence detectors and multisensors	page <b>60</b>
	microwave sensors	page <b>61</b>
	switch interface	page <b>62</b>

## IP telephone control



product ref: 126B1

IP telephone control enables individuals to switch and dim lighting from their telephone as well as control temperature, window blinds and other services.

IP phone control



**A Delmatic IP Telephone interface server** connects to the building IT network and monitors lighting commands entered via IP telephones. The unique IP address of each telephone is matched through the lighting management system online database to lights in the area.

From the IP telephone function buttons and/or screen, lighting may be switched on or off, dimmed up and down, or set to one of a number of lighting scenes as well as custom user-preferred lighting levels.

IP telephone control is:

- easy to implement
- can be configured for all phones
- offers instant response
- suitable for hot desk applications

The IP telephony facility comprises hardware & software.

### Hardware

An **IP Telephone interface server** connects to the IP network and communicates with the Delmatic head-end PC and lighting control modules.

### Software

Delmatic's **Lightscape IP Telephone software** on the head-end PC enables drag-and-drop matching of phone IP addresses to groups of lights.

**Delmatic IP Phone browser software** allows individuals to switch and dim lighting from their IP phone.

## web browser control



product ref: 138A1

Web browser control enables individuals to switch and dim lighting from their PC desktop as well as control temperature, window blinds and other services.

Web browser control



**A Delmatic Web browser interface server** connects to the building IT network and monitors lighting commands entered via desktop PCs. The unique IP address of each workstation is matched through the lighting management system online database to lights in the area .

Function button icons and slider bars on the PC desktop enable lighting be switched on or off, dimmed up and down, or set to one of a number of lighting scenes as well as custom user-preferred lighting levels.

The web browser function can integrate with the PC to dim lighting when the computer screen saver activates or to turn lighting off when the PC has been turned off.

IP web browser control is:

- easy to implement
- can be configured for all workstations
- offers instant response
- suitable for hot desk applications

Web browser control comprises hardware & software.

### Hardware

A **web browser server** connects to the IP network and communicates with the Delmatic head-end PC and lighting control modules.

### Software

Delmatic's **Lightscape Web Browser software** on the head-end PC enables drag-and-drop matching of PC IP addresses to groups of lights.

**Delmatic Web Browser software** allows individuals to switch and dim lighting from their PC desktop.



The **personal transmitter** empowers individuals with control of lighting levels and scenes as well as integrated control of other services including window blinds and audio-visual devices.

The precision-cast aluminium body incorporates organic curves for style and comfort, as well as soft touch buttons and pads.

The device is fully configurable and provides control of five lighting scenes with a master raise/lower facility.

The **transmitter** sends infra-red lighting level and scene selection commands to a ceiling-mounted **multisensor** and/or to **scene-set panels** which incorporate an infra-red receiver for remote selection of scenes.

- precision cast aluminium body
- five scene or function buttons
- master raise / lower function
- compatible with multisensors and scene-set panels

## dimensions

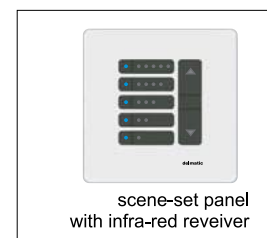
length	138 mm
width	48 mm
depth	25 mm

## power

The transmitter is powered by two type N 1.5V batteries

## scene-set panels and multisensor

The transmitter is compatible with multisensors and scene-set panels. Multisensors enhance energy-efficiency through motion detection (configurable for presence or absence detection) and photocell sensor which add presence-related control of lighting and HVAC & daylight-linking to the overall control package.



scene-set panel with infra-red receiver



multisensor

## touchpad and touchpanel

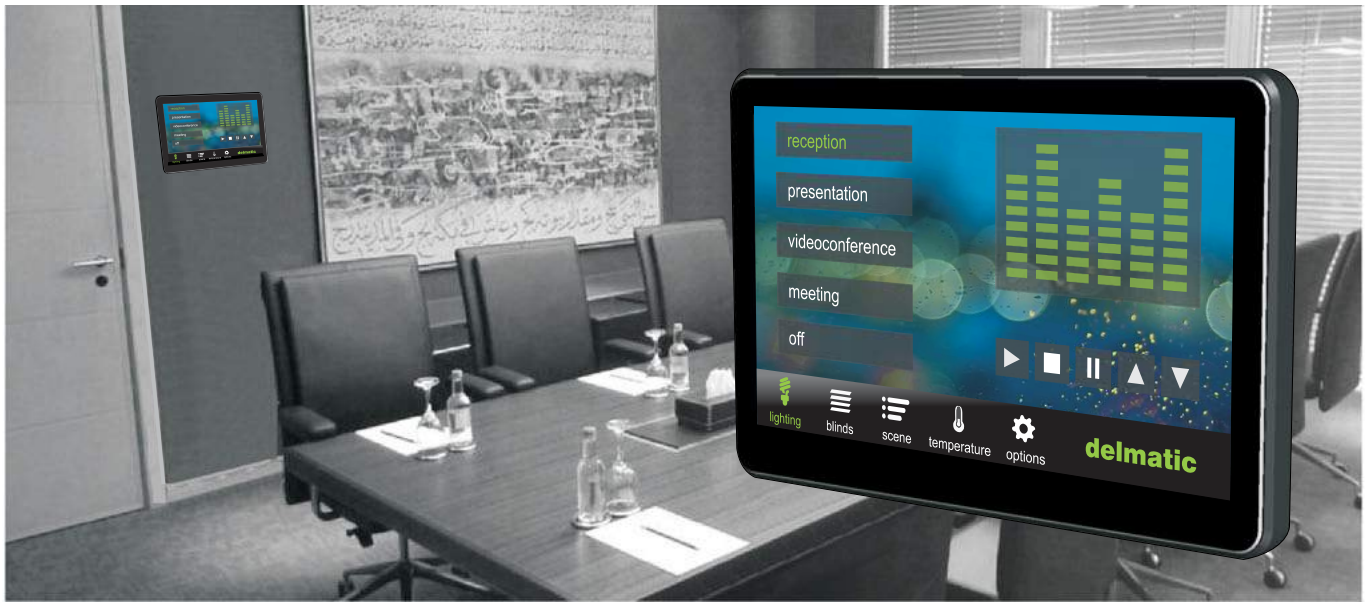
The **transmitter** forms part of Delmatic's range of user control devices including the **touchpanel** and **touchpad** which enable control and adjustment of multiple services including lighting, window blinds & temperature, as well as selection of lighting scenes and AV functions.



touchpanel



touchpad



The **touchpanel** provides user control and adjustment of lighting and other services via an advanced graphical user interface.

The powerful device can be used for integrated scene-setting and control within meeting and conference areas, yet can also be used for graphical management and monitoring of a complete lighting installation in place of a network PC.

The 10" display provides high-resolution graphics which are fully software configurable with custom images and logos, multiple sub-menus as well as configuration options and preferences.

Users are able to flip instantly from one function to another, effortlessly controlling lighting and scenes, as well as integrated services including blinds, temperature and AV functions.

The **touchpanel** can connect direct to a Dali network or, via Lon, BACnet and IP, to other interoperable building services devices.

- 10" TFT LCD touchscreen
- 800 x 480 RGB resolution
- fully configurable graphical screens and functions
- automatic dim and screen saver function
- switchable button beep
- scalable graphics
- import function of .bmp, .png, .jpg and .gif formats
- animation functions for graphical object animation
- Dali, Lon, BACnet or IP connection
- 24V operation

### dimensions and mounting

	fascia	backbox cutout
width	258 mm	212 mm
height	170 mm	146 mm
depth	10 mm (in front of wall)	70 mm (behind wall)

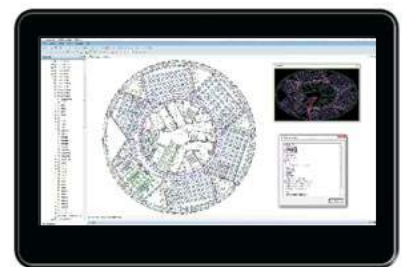
the touchpanel can provide integrated user control of lighting scenes, blinds, temperature and other services



the touchpanel can incorporate colour changing controls for DMX and LED drivers



the touchpanel can be used for graphical management and monitoring of a complete lighting installation







The **touchpad** provides user control and adjustment of lighting and lighting scenes, as well as other services including audio-visual functions, window blinds and temperature set-point: an integral sensor measures the room temperature at desk level avoiding the need for wall-mounted sensors.

The touchpad combines a precision cast aluminium body with glass 3.5" LCD display, stand-by mode with wake-up button, and integral USB charging port.

The touchpad incorporates context-sensitive graphical screens to provide intuitive operation and a wide choice of software configurable functions.

The touchpad transmits infra-red data to a ceiling-mounted multisensor. The multisensor enhances overall control through its integral motion detector (configurable for presence or absence detection) and photocell sensor which add presence-related control & daylight-linking to the overall control package.

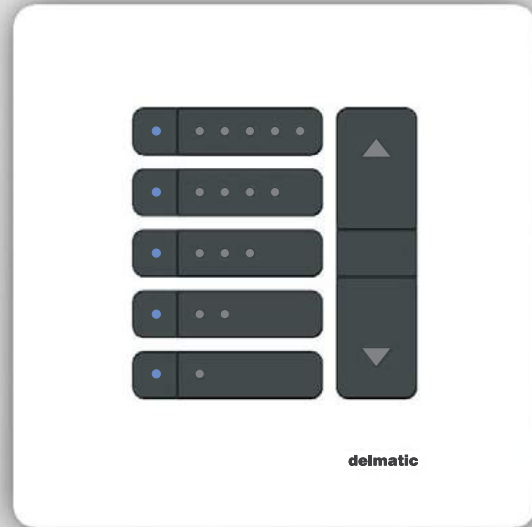
- 3.5" LCD touchscreen
- Real-time lighting level, temperature & set-point display
- Integral room temperature sensor
- Infra-red communication avoids buswires & installation
- Internal rechargeable battery
- USB charging port
- Software configurable through USB port

## dimensions and mounting

width	110 mm
depth	95 mm
height	35 mm

the touchpad is equipped with an integral USB charging port and integral room temperature sensor





**Scene set panels** provide control of lighting scenes and integrated functions including blinds & audio-visual equipment.

Scenes are fully configurable through graphical software and may be actioned locally from the scene set panel, activated automatically based upon timed schedule or daylight levels, or manually through the head-end software. The scene set panel indicates the current lighting scene irrespective of whether this has been selected locally or centrally, while master raise and lower function buttons enable the global level of the selected scene to be raised or lowered to suit occupant preferences.

The contemporary design comprises a clip-on fascia, soft-touch pads with blue LEDs indicating the current scene, and an integral infra-red receiver enabling remote selection of scenes from a personal infra-red transmitter or touchpad.

- five or ten scene set buttons with status indication
- master raise / lower function for selected scene
- screwless stainless steel fascia (other finishes available)
- integral infra-red receiver for remote scene activation from personal transmitter or touchpad

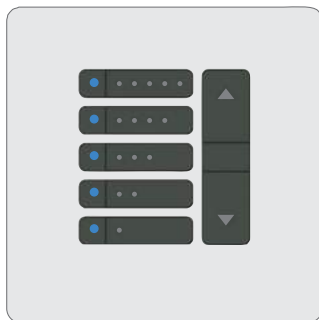
Scenes may be remotely activated using a personal **infra red transmitter** or **touchpad**.



## dimensions and technical details

- dimensions** single gang panel: 86mm x 86mm  
two gang panel: 146mm x 86mm
- depth** depth behind wall - 25mm  
(fits 35mm box (not supplied))
- finish** standard panel finish is brushed stainless steel with soft-touch buttons and blue LEDs; alternative finishes available to order
- cabling** connects to two core network bus (refer to Buswire Specification data sheet for cable specification)

## five scene panels



product ref: **123C2**

Five scene set panel with master raise and lower buttons and infra-red receiver



product ref: **123D1**

Five scene set panel with master raise and lower buttons and infra-red receiver. Two gang plate allows integral mounting of third party control such as temperature selector.

## ten scene panels



product ref: **123D2**

Ten scene set panel



product ref: **123D3**

Ten scene set panel with master raise and lower buttons and infra-red receiver.



product ref: **123D4**

Ten scene set panel with master raise and lower buttons, window blind raise / lower buttons and infra-red receiver.

Sensors maximise energy-efficiency by relating lighting to occupation and the amount of daylight contribution.

Delmatic sensors provide passive infra-red presence detection, absence detection, and daylight-linking, accept switching, dimming & scene commands via an integral infra-red receiver, and can accept temperature and set-point data for integrated control of HVAC and enhanced energy-efficiency.

The sensors are designed for total versatility in installation, and can connect to plug-in modules, daisy-chain on a common bus, and wire directly to a Dali buswire, saving materials, time and money.

The small diameter, low-profile contemporary design incorporates a single piece lens and bezel which blends discretely into the ceiling.



## multisensor

product ref: **164A1**



The **multisensor** optimises energy-efficiency by combining passive infra-red presence / absence detection with daylight linking so that lighting is related to both occupancy and daylight.

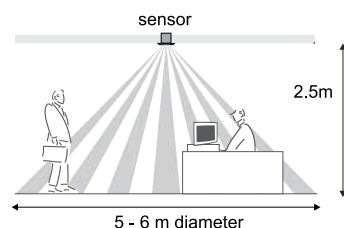
The multisensor is fully software-configurable and may be set to operate in **presence** or **absence** detection mode: the presence detector time-out is software-adjustable while default illumination levels, photocell thresholds and other parameters are fully configurable.

The multisensor includes an infra-red receiver that enables users to adjust lighting levels using an **infra-red transmitter**, and accepts lighting, blind, temperature & set-point data from **touchpads** so lighting, heating & cooling are linked to occupancy.



### detection field

The sensor provides a circular detection field with a diameter typically twice the mounting height.



### installation

Delmatic **Sensors** are totally versatile in installation and can connect to the lighting control network in a variety of ways. Sensors can:

- plug directly into ports on Dali Plug-in modules
- connect to the intelligent control bus from any module
- connect to the Dali Broadcast channel buswire
- connect direct to the Dali buswire

## presence detector

product ref: **163A1**



The **presence detector** saves energy by relating lighting to occupation and switching lighting off in vacated areas.

The detector is software-configurable to operate in **presence mode** (switching lights on when motion is sensed and off after the area is vacated) or **absence mode** (with lighting manually energised by switch, transmitter, phone or web-browser, and switched off after the area is vacated): the time-out is also software configurable with a default of fifteen minutes.

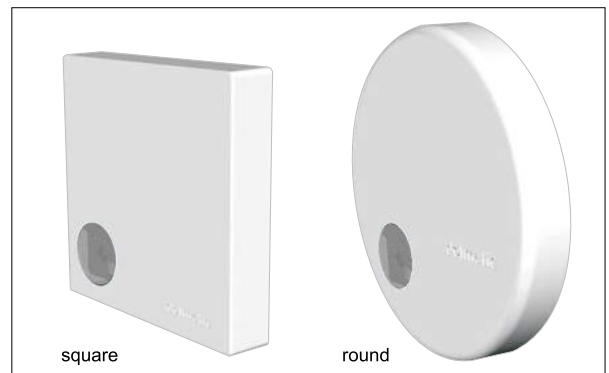
### dimensions

height above ceiling	35 mm
projection below ceiling	5 mm
body diameter	39 mm
bezel diameter	49 mm
<b>cut-out diameter</b>	<b>40 mm</b>

Microwave sensors achieve energy-savings by relating lighting to occupation and the extent of daylight.

The microwave sensors provide motion detection within an extended area and incorporate a highly sensitive detector which emits low power microwave signals & measures the reflections as the signals bounce off moving objects.

The sensors connect to plug-in modules or direct to the Dali bus: for ease of installation, a sensor can derive its power from the module or buswire, avoiding the need to provide a 230V supply.



## microwave presence detector

product ref: **165M1**

The **microwave presence detector** achieves energy savings by relating lighting to occupation and switching lighting off in vacated areas.

The detector is software-configurable and may be set to **presence mode** (switching lights on when motion is sensed and off after the area is vacated) or **absence mode** (with lighting manually energised by a switch etc) and switched off once the area is vacated: the time-out is also software configurable with a default of fifteen minutes.

The microwave presence detector is supplied with interchangeable square and round clip-on fascias.

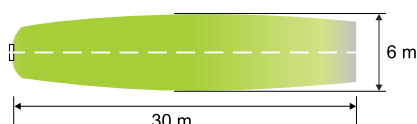
### installation

The sensor should be wall mounted at a height of 1.2m to 1.5m. The sensor should not be located on a vibrating surface or within 1m of any lighting or ventilation equipment and should be sited as far away as possible from the surface of metal objects.

The sensor can connect to the local control bus from **Six Six** and **Twelve Twelve** hard-wired modules, or wire directly onto the Dali bus from **Dali Buswire & Dali Broadcast** modules.

### detection field

The sensor provides a linear detection field of 30 metres length by 6 metres width.



Note: unit is very sensitive at maximum setting and may detect motion through thin walls or partitions.

## microwave multisensor

product ref: **166M1**

The **microwave multisensor** provides enhanced energy-efficiency by combining infra-red presence / absence detection with daylight linking so lighting is related to both occupancy and daylight.

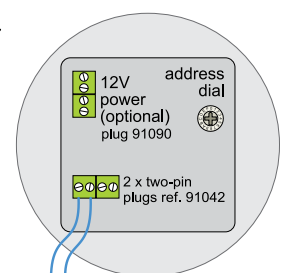
The multisensor operation is fully software-configurable including selection of presence or absence mode, time-out period & photocell sensitivity thresholds.

The multisensor also incorporates an infra-red receiver which receives switching and dimming commands from **personal infra-red transmitters**.

The microwave presence detector is supplied with interchangeable square and round clip-on fascias.

### wiring connections

The sensor obtains its power from the module to which it connects: if more than two microwave sensors are connected on a shared buswire, additional power must be provided using a 12V PSU wired to the sensor.



2c to lighting control module or shared/Dali bus

### dimensions

	round	square
<b>fascia</b>	125 mm	100 x 100 mm
controls - width x height	80 x 80 mm	
depth (front) from wall	20 mm	
depth within wall	25 mm	

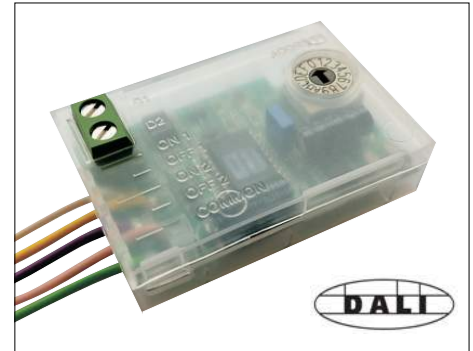
Mounts to UK standard single-gang 40mm depth flush box (not supplied)

# DALI switch interface

switch interfaces enable standard momentary-action (two-way-and-off retractive) switches to be converted into system switches or Dali switches: in this way, system switches and Dali switches can have the same plate finish as other electrical accessories in the building.

Dali switch interfaces enable two independent switches to be connected to a shared buswire and avoid the need to wire individual switches back to multiple input points. The switch interfaces also connect to the shared Dali buswire which links Dali ballasts, Dali presence detectors and multisensors and Dali emergency devices, reducing the extent of wiring on a project.

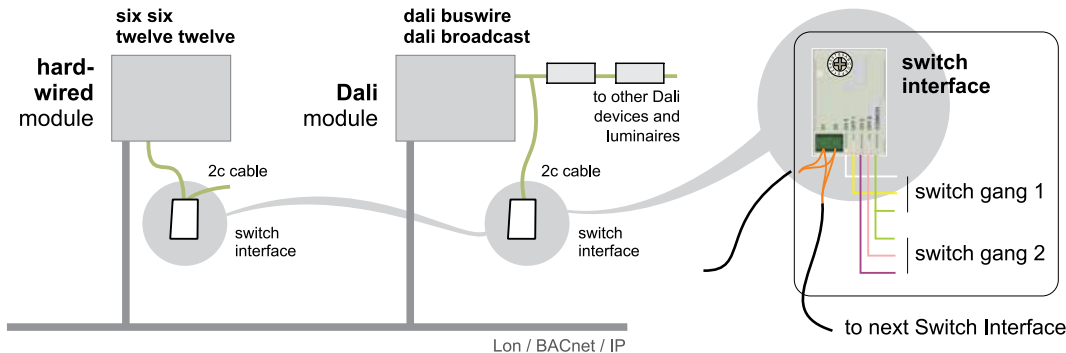
The switch interface comprises a compact electronic device that fits within a switch backbox and connects to the switch terminals and to the smart/Dali bus. Switching and dimming actions at the switch are converted into commands which are transmitted to the lighting management network.



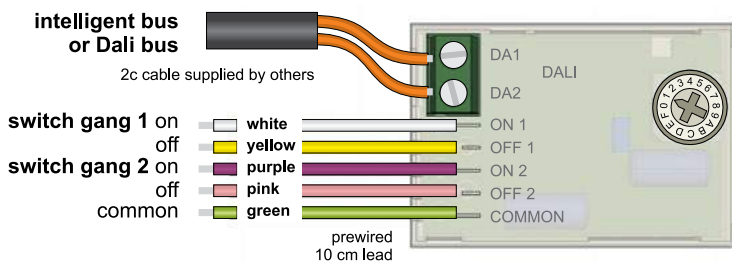
## installation

Within core areas, **switch interfaces** typically connect along a shared buswire to an input at a hard-wired **six six** or **twelve twelve** module: **switch interfaces** avoid the need to wire individual switches back to multiple input points.

As part of a Dali network **dali switch interfaces** connect to the shared Dali bus which links Dali ballasts, sensors and Dali emergency devices.



## wiring



## configuration

The rotary dial sets the interface to one of sixteen addresses, 1-9 plus 10(A), 11(B), 12(C), 13(D), 14(E), 15(F) & 16(0).



When used with a two-gang switch, setting the dial to one number assigns that address to gang 1 and the next address to gang 2: eg. setting the dial to 3 sets gang 1 to address 3 & gang 2 to address 4.

**dimensions** 46 mm x 32 mm x 14 mm (h)

Parallel or two-way operation is achieved by setting two interface units to the same address.

Delmatic systems enable comprehensive testing and monitoring of the entire emergency lighting installation in a building using DALI emergency invertors as well as emergency photocell and battery monitoring units for non-Dali gear.

Tests may be initiated automatically by the system software in accordance with statutory intervals and durations, and may also be actioned manually from routers or programmed keyswitches across the network.

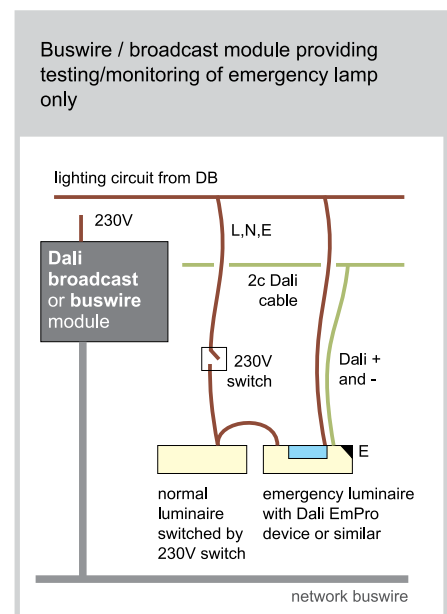
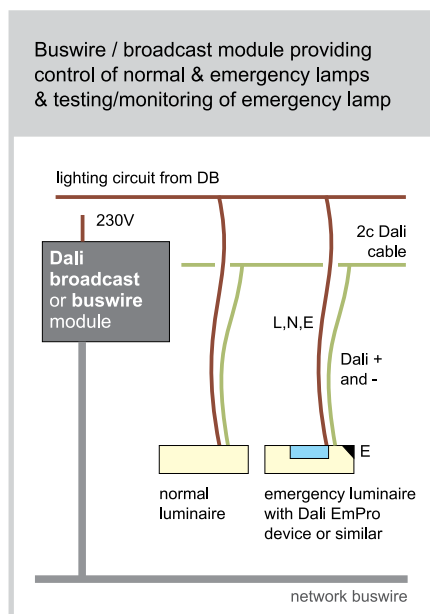
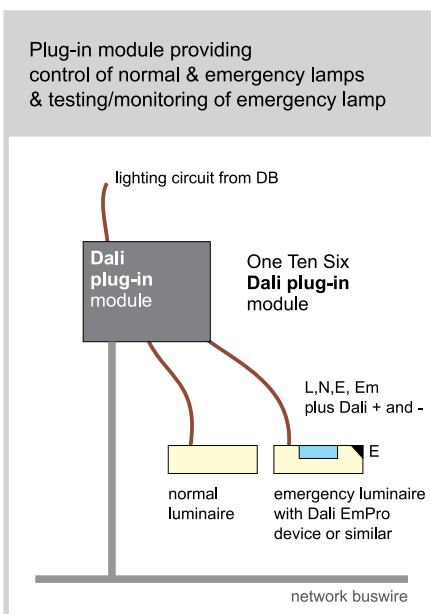
Delmatic Lightscape software provides detailed monitoring for maintenance, analysis and statutory purposes.

The system logs the time, date and duration of each test, monitors, records and graphically highlights pass/fail test performance for each emergency lamp and device, tracks a range of information related to the fitting including battery charge and discharge, and logs additional information including premature termination of a test: asynchronous testing avoids all emergency lighting in an area being tested (and potentially depleted) at the same time.

Dali emergency devices such as EmPros are available for the majority of fluorescent lamps as well as for other sources such as LEDs (irrespective of whether the lamp itself is fitted with a Dali ballast). Delmatic systems provide emergency light testing and monitoring of these Dali emergency devices as well as emergency photocell and battery monitoring units .

Dali emergency devices connect to the two core Dali buswire from a Delmatic Dali Plug-in module, Dali Buswire module or Dali Broadcast module allowing comprehensive monitoring of every emergency lamp and device through the graphical software.

Lighting within plant rooms and similar areas is traditionally not controlled by a lighting management system and switched locally by 230V switches: however emergency lighting within these areas can now be tested and monitored as an integral part of the lighting management system.





To ensure reliable and efficient operation of the lighting management system and peripherals it is important that the specified cables or their equivalent should be used.

## network cable (Lon and BACnet)



up to 1000 metres

Recommended cable: Twisted pair Firefighter Belcom 4001P2044-BW-20AWG

up to 1500 metres

Recommended cable: Twisted pair Firefighter Belcom 4001P1444-14AWG

## Dali cable



maximum 300 metres

Recommended cable: Twisted pair Firefighter Belcom 4001P1444-14AWG

### cable properties

	Twisted pair Firefighter Belcom 4001P2044-BW-20AWG	Twisted pair Firefighter Belcom 4001P1444-14AWG
Conductor:	stranded twisted copper wire	stranded twisted copper wire
AWG:	2 x 20 awg	2 x 14 awg
Colour code:	black / white	black / white
Temperature range:	-20 to *90 degrees centigrade	-20 to *90 degrees centigrade
<b>Voltage rating:</b>	<b>600 volts</b>	<b>600 volts</b>
Fire performance:	IEC60332-1, IEC60332-3, IEC61034, IEC60754-1, IEC60092	
Nominal diameter (mm):	4.57	8.64
Weight (kg/km):	21	96
Conductor DC resistance:	33 ohm/km (nominal)	9.38 ohm/km (nominal)
Nominal inductance:	0.56µH/m	0.56µH/m



UK Building Regulations, BREEAM, LEED and ESTIDAMA all share a common goal - to enhance energy efficiency, encourage sustainability and cut carbon emissions.

## Building Regs Part L

UK Building Regulations Part L 2013 set out fundamental requirements which must, by law, be met when designing a project. The regulations are not only about improving energy efficiency but also about understanding where energy goes in a building and taking steps to monitor and reduce this. To this end they encourage sustainable design & construction, include requirements to conserve and measure energy use in buildings, and advocate the adoption of green energy & control systems.

Delmatic lighting management systems address all the requirements of Part L through the provision of manual control, presence and absence detection, daylight-linking, as well as energy metering and monitoring.

## BREEAM, LEED and ESTIDAMA

Environmental assessment methods such as BREEAM, LEED and ESTIDAMA set the standards for best practice in sustainable design and development, and their design and performance-assessment methods enable owners, designers and users of buildings to review and improve environmental performance throughout the life of a building.

The schemes set criteria surpassing those required by regulations, and encourage innovation to minimise the environmental impact of buildings as well as recognition of low impact buildings.

Delmatic connected lighting management systems offer outstanding energy and operational efficiency and, by assisting in sustainable building design, enable the achievement of high scores and ratings.

Delmatic systems gain credits across the various assessment categories addressing issues such as light pollution reduction, managing lighting, daylight and glare, presence-related control of scarce resources including energy and water, energy monitoring and reporting, minimising waste through longevity of life and maximising re-use, as well as continuous innovation in design.



Delmatic projects are typically awarded **excellent** and **outstanding** assessment ratings



## find out more

Delmatic produce a range of documents and CPD seminars on "Lighting management & Building Regs – a clause by clause analysis" as well as section by section studies detailing how lighting management systems help achieve high BREEAM, LEED and ESTIDAMA ratings.

email [delmatic@delmatic.com](mailto:delmatic@delmatic.com) or phone **020 3184 2000** for more information

## 1.0 Overview

The project will be equipped with a site-wide lighting management system comprising lighting control modules, routers, PC and local control devices, and providing flexible and efficient monitoring/management of lighting. The system will provide high-speed communication (minimum 75,000 bps) and use an open protocol as ISO14908 to avoid reliance on a single vendor. The system will use handshake acknowledgments & confirmed receipt of signals between hardware.

Graphical virtual wiring software will enable lighting operation to be programmed & adapted, and allow switching and dimming patterns to be adjusted from the PC without the need to access equipment or carry out wiring alterations.

The system will incorporate distributed intelligence, and every module will contain built-in intelligence to ensure that local operation continues in the event of network PC or Router failure. For maintenance and future-proofing it will be possible to remotely upgrade on-board software on all system hardware from any point on the network. Integrity of operation is paramount and control modules shall be powered by mains power sources. To avoid single points of failure no modules will derive operating power from the buswire or any central/field bus power supplies.

### Head End Software and Project Graphics package

System operation shall be monitored by the network PC, and project-specific graphics shall provide the following:

## 2.0

- multi-level password access.
- active status of each individually addressed luminaire and hard-wired output.
- project specific graphics detailing building and partition layouts and the position of each luminaire.
- lamp failure status for each Dali luminaire.
- hours run monitoring for each individually addressed luminaire and hard-wired output.
- virtual wiring enabling switching / dimming patterns to be configured through drag and drop graphics.
- hardware monitoring detailing the operational status of each module.
- automatic calendar scheduling with multiple regimes to suit different working patterns.
- interactive corridor hold function to secure exit lighting while office areas are in use.

## 3.0 System Hardware

### 3.1 Network PC

The PC will comprise an Intel Core i3 processor, 250GB Hard drive, 2GB RAM, CDRW, LNS network card & flat screen monitor, and will be loaded with Windows software, lighting management software and project graphics package.

### 3.2 Router / Smart IP Router.

Routers will connect the vertical and horizontal buswire networks and optimise transmission of data. Routers will provide password-protected access to master commands and monitoring functions and accept inputs for master on/off operation, load shedding and emergency-test routines. Where the lighting management system shares the IT backbone, Smart IP Routers will be supplied incorporating IP technology including 10/100 Base T Ethernet, FT-10 connections & remote web configuration, with the facility for software upgrade to include BACnet integration.

### 3.3 Lighting Control Modules

The system will include a range of lighting control modules described below and detailed on the project lighting layouts.

- 3.3.1 **Dali Plug-in Lighting Control Modules** will provide individual control and monitoring of nine Dali outputs. Modules will be equipped with nine ports for the plug-in connection of luminaires and will automatically address each port to avoid the need to address ballasts after installation. Where Dali Zero Power is specified, modules will also be equipped with an individually addressed switching relay for each port. The modules will individually monitor Dali emergency devices within each luminaire. The module will be equipped with a 3 pin connector for the plug-in connection of the incoming mains supply and will accept the plug-in connection of sensors and switches. The module will use plug-in electronic technology for ease of long-term maintenance and accept capsules for plug-in intelligence and Dali control.
- 3.3.2 **Dali Broadcast modules** will provide the dimming and monitoring benefits of Dali without the need to individually address each ballast after installation. Dali Broadcast Modules will provide addressable control of twelve Dali channels with up to twenty Dali ballasts per channel: Dali sensors, Dali switches and Dali emergency test & monitoring units will also connect to the two core Dali bus channel from the module. The modules will monitor individual Dali lamp and ballast failure and display this on a channel basis, and display Dali emergency device status on an individual basis.
- 3.3.3 **Dali Buswire modules** will individually address, switch, dim and monitor individual Dali ballasts along a common two core bus cable. The address of each luminaire ballast will be assigned after installation through software via a hand-held programming device or laptop. Lighting circuit(s) powering luminaires will be wired directly from the distribution board to the luminaires: a 230V supply will provide power to the module. Dali presence detectors, Dali multisensors, Dali switches and Dali emergency test & monitoring units will also connect to the two core Dali bus from the module. Modules will control and monitor 64 Dali devices and, in addition, accept the connection of 16 Dali sensors/switches.

3.3.4 **Circuit Switching Modules** will provide addressable switching of lighting circuits and/or hard-wired groups of luminaires. The multi-circuit modules will be equipped with 20A mechanically-latched relays which, in the event of failure, remain in their last state and may be manually operated on and off from the module. The modules will accept the connection of intelligent local devices including switches, presence detectors & multisensors.

### 3.4 Local Control Devices

3.4.1 **Presence / Absence Detectors** will relate lighting to occupancy and extinguish lighting after a programmed delay following vacation of an area. The operation of each detector will be software-configurable including the mode - presence (on/off) or absence (off-only) – and the time out delay.

3.4.2 **Multi-Sensors** will combine presence detection with daylight-linking/harvesting and an infra-red receiver for use with remote transmitter or touchpad. The operating mode and time-out period of the presence detector as well as the sensitivity and configuration properties of the photocell will be software configurable.

3.4.3 **Web Browser Control / IP Telephony** will enable users to switch and dim lighting from their desktop PC or IP phone: graphical software will enable “matching” and importing of telephone and PC IP addresses to luminaires.

3.4.4 **Switches / Scene-Setting.** Momentary-action switches will be programmed through software to operate the relevant luminaires on/off/up/down. Scene-set panels will provide five programmed scenes together with a master raise/lower facility: an integral IR receiver will enable remote scene selection from hand-held transmitter or touchpad. Scene-set panels will indicate the current scene whether this has been initiated from the panel or centrally/automatically.

3.4.5 **Touchpad.** My-Touchpad will provide user control and adjustment of lighting levels and lighting scenes (and integrated control of window blinds and temperature) via a context-sensitive LCD touchscreen.

3.4.6 **Touchpanel.** The Touchpanel will provide user control and adjustment of lighting levels and lighting scenes (and integrated control of other services including AV) via a context-sensitive 10” LCD TFT touchscreen.

3.4.7 **Infra-red transmitter.** The personal infra-red transmitter will provide user control of five programmed lighting scenes together with a master raise/lower facility.

4.0 **Emergency light testing and monitoring.** The lighting management system will provide integrated testing and monitoring of emergency lighting. Self-contained emergency luminaires will be equipped with Dali emergency devices and the system will monitor and log lamp, ballast and battery performance. The system will enable tests to be scheduled to operate automatically at intervals and durations specified within EN 50172.

### 5.0 Interfaces and Integration

5.1 **Fire alarm interface.** The lighting management system will interface with the fire alarm system such that all exit lighting in the building is automatically switched on in the event of the fire alarm sounding.

5.2 **Demand response and loadshedding.** The lighting management system will restrict or dim lighting to avoid exceeding peak demand or overloading a back-up generator. The system will enable lighting to be configured as essential or non-essential and to operate under one of a number of loadshed scenarios.

5.3 **BMS Interface.** The system will interface with the BMS for sharing of global commands and hardware status.

5.4 **Open protocol integration with other services.** The lighting management system will be able to integrate and interoperate seamlessly with Lon and BACnet devices at a device-to-device level and without the need for a gateway. Devices may connect to the lighting management system network or be on a separate network joined via a Coupler.

### 6.0 General

The system will be supplied and commissioned by a specialist lighting control system manufacturer/supplier. The electrical contractor will purchase the system hardware and software from the supplier and will install the hardware, cabling and buswires as part of the electrical installation. The system will be supplied such that the contractor can validate power and bus wiring during installation, prior to making the system available for commissioning by the controls supplier. As part of the installation, the contractor will record the module addresses and luminaire/lamp connections on the drawings to enable preparation of the lighting management databases by the system supplier.





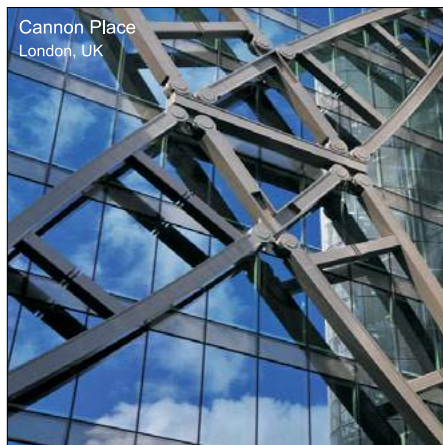
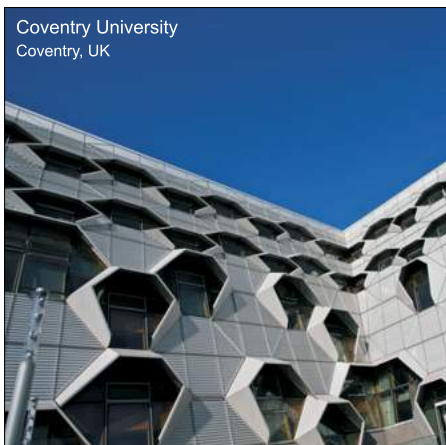
Delmatic are acknowledged experts in the design and application of lighting and integrated energy management systems, and our experience is available as a resource to project consultants and designers.

Delmatic also offer a selection of in-house CPD courses ranging from general overviews of lighting management to focus seminars providing in-depth studies of topics such as DALI, Building Regs, Breeam, Leed & Estidama.

The CPD courses, which have been assessed against best practice guidelines, are accredited by CIBSE and count towards an individual's CPD requirement.

Delmatic's range of CPD seminars is outlined on the opposite page, and detailed agendas for individual seminars are available by emailing [cpd@delmatic.com](mailto:cpd@delmatic.com) or phoning **020 3184 2000**.

*"With their depth of knowledge and experience of UK and international projects Delmatic were ideally placed to provide us with a factual, informative and enjoyable seminar."*



overview of lighting management

This seminar provides a comprehensive overview of lighting management covering key topics including Building Regs Part L, BREEAM, Dali, system architecture, open protocols,

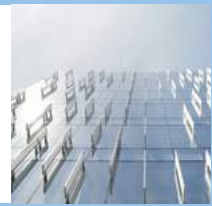
interoperability & integration, emergency light testing & monitoring, as well as project management and system applications.



detailed design and application

This seminar studies the various controls and technologies available, and considers their application based upon a project type, light sources, degree of flexibility required, and the

preferred installation approach. The seminar recommends optimum approaches for typical project types & building areas.



Building Regs Part L and BREEAM

This detailed session studies Building Regulations Part L2 (2013) and BREEAM (2011) on a clause by clause basis, and considers how lighting management meets

Part L and assists in achieving the highest BREEAM ratings. The session also investigates how integration with HVAC and solar shading can achieve higher BREEAM scores.



BREEAM, LEED and ESTIDAMA

This focused session looks at three international design programmes - BREEAM, LEED & ESTIDAMA - studying their similarities as well as differences and regional biases.

The session assesses clause by clause how lighting management and open system integration assist in achieving the highest ratings for each of the schemes.



DALI

This detailed seminar focuses on DALI, looking closely at the technical and installation considerations of DALI, exploring the various ways in which DALI can be applied, the

benefits of the various approaches, ways to avoid on-site addressing of DALI ballasts, as well as latest updates on DALI emergency testing and monitoring.



open systems and interoperability

This seminar focuses on open systems and open protocols, looking at the technical benefits of integration and interoperability as well as the capital cost and operational cost

savings. A sequence of flowcharts and schematics guides delegates through the integration process.



## technical advice

Delmatic offer a comprehensive advisory and design service to consultants interested in the application of advanced lighting management and energy optimisation systems.

Our experience in supplying systems over more than fifty years coupled with detailed knowledge of current and emerging technologies enables Delmatic to give unique insight and advice on the best-practice application of systems.

Our involvement starts from the earliest days of a project, working with the team to understand the requirements of the building and to develop a design and system solution that precisely suits the individual project.

We assist in the development of scheme & concept designs, the preparation of system specifications and the creation of project-specific schematics and layouts: we subsequently liaise with tendering and installing contractors, and hand-over a fully operational system to trained client personnel.

The growing trend towards sustainable buildings design means that lighting, air-conditioning, solar shading & security systems increasingly work together, and Delmatic are able to assist in the project design and application of open-protocol integrated systems.

## project management

Effective project management is essential to the success of any installation, and Delmatic coordinate every stage of a project from initial design, delivery and installation through to final commissioning, training and handover.

Dedicated project teams plan and coordinate each project through to final completion – deploying resources, scheduling deliveries, developing technical submissions and descriptions of operations, preparing commissioning programmes, issuing documentation and arranging training, as well as continually monitoring progress.

Pre-installation tool-box talks and regular review meetings ensure contractors are fully up to speed with the system hardware and installation, and provide electricians with handy tips and guidelines for an optimum install.

To guarantee technical competence at the highest level, Delmatic maintain a team of full-time commissioning engineers who carry out system configuration and commissioning. The complete process is overseen by a project manager who, together with the project engineers, ensures systems are configured, commissioned and handed over on time.

## Find out more

To discuss the application of lighting management to a project or simply learn more about technologies and systems, mail

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# delmatic

Delmatic specialise in the design and supply of connected and interactive lighting management solutions using the international open protocols of Dali, Lon, IP and BACnet, and assist in developing sustainable systems which seamlessly integrate lighting, air-conditioning, solar shading and security.

Our experience over more than fifty years coupled with detailed knowledge of current and emerging technologies enables Delmatic to give unique insight and advice on the best-practice application of systems, while our unmatched research and development programme creates integrated hardware and software at the cutting-edge of the electronics, lighting and IT sectors.

Delmatic's service embraces every stage of a project: working with client teams from the initial stages of design; providing unmatched technical assistance to develop an optimised lighting and energy-management scheme; offering comprehensive project management during installation and culminating in the handing-over of a fully-operational system and a lifetime relationship with the building occupier.

With offices in London, Abu Dhabi, Dubai, Qatar and Saudi Arabia and partners in key markets throughout the world, Delmatic provide a comprehensive technical resource for international project teams, and excel in the development of innovative and sustainable solutions for an international client base.

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