Overview: Single Floor Pluggable Solution

The lighting control solution will consist of networked, pluggable LCM’s that will accommodate DALI or switched luminaires as indicated on the drawings. Luminaires shall connect via prefabricated leads – both power and DALI.

The proposed solution must operate without a central processor (Area controller) and should employ fully distributed intelligence, eliminating the risk of a single point of failure and ensuring controls resilience.

The proposed solution will allow for:

* Connection of any luminaire to any port
* Capacity to support DT8 Tuneable white DALI luminaires
* All ports to accommodate a DALI or Conventional Emergency luminaire
* Each port to accommodate the connection of a DALI Sensor, DALI input unit or control plate
* DALI Luminaires to be automatically initalised and addressed without engineering intervention.
* Immediate ‘Out of the box’ local LCM functioning lighting control
* A wired backbone connecting all installed LCM’s on a floor.
* Contractor/installer local and floor test functions.

The lighting control solution must allow for future re-configuration of the space. Provide the ability through software for sections of a floor, complete floors or multiple floors to be assigned to a single tenant and/or sub-divided as required to allow for multiple tenants.

The LCM shall support local self-healing for all connected DALI devices, this shall also include those ports with more than one connected luminaire.

Table of Contents

[Distributed Intelligence 2](#_Toc78552634)

[Lighting Control Modules – Networked Pluggable 3](#_Toc78552635)

[Occupancy Detection 4](#_Toc78552636)

[System Configuration & Control Features 5](#_Toc78552637)

[System Expansion and Onward Integration 5](#_Toc78552638)

[Emergency Testing 5](#_Toc78552639)

[Commissioning – Lighting System Manufacturer 6](#_Toc78552640)

# Distributed Intelligence

The system should employ truly distributed intelligence, eradicating the reliance on any single item of hardware or remote central processor for reliable operation. Each device should use its own non-volatile memory to store programming data pertaining to operation of its inputs, outputs and control functions.

# Lighting Control Modules – Networked Pluggable

For ease and speed of installation, pluggable LCMs shall be employed and shall provide the following:

* 10 ports (GST-18 type) each with DALI, relay switched output and maintained supply
* Automatic addressing of DALI without engineering intervention
* 30 DALI luminaires (or short addresses) per LCM, distributed at will across the 10 ports.
* Each port also supports
	+ 1x DALI Emergency Luminaire
	+ 1x DALI Input module (four potential free inputs) or DALI Scene control plate
	+ 1x DALI Sensor
* Supports DALI type 8 Tunable white
* Full DALI feedback for lamp status, driver, ballast etc.
* Emergency testing of DALI and conventional luminaires
* Qty 4 – Volt free inputs
* A wired bus/network connection for communication with other Lighting control modules and/or head end PC

It should be possible to connect any luminaire to any of the LCM’s 10 ports. All luminaires should be addressed automatically without engineering intervention, DALI conflicts or addressing issues resolved automatically.

To provide complete flexibility each port will also support the connection of:

* 1x DALI Emergency Luminaire
* 1x DALI Input module (4x volt-free inputs) or DALI Scene control plate
* 1x DALI Sensor

All luminaires connected to a specific LCM shall automatically switch/dim together as a group by default.

Each volt-free input will be pre-configured to allow the installer/contractor to test the installation without the need for commissioning software tools or engineering intervention.

Input 1&2

* On/Raise and Off/Lower – Dual position retractive switch to allow the control of all luminaires connected to the LCM. Momentary press-release will switch the connected luminaires on and off. Press and hold will dim (raise and lower) all connected luminaries.

Input 3

* Will provide bus/network-wide emergency test – Single latching fish-key. Emergency test mode can be set or released.

Input 4

* Will provide a whole bus/network test function – Single retractive switch – to enable a dim up – dim down cycle allowing the installer/contractor to walk a floor or area and validate;
* a) the bus/network is intact
* b) all connected luminaires are dimming or switching as desired.

The proposed controller must employ fully distributed intelligence and should have no reliance on a remote central processor or area controller.

# Occupancy Detection

Occupancy sensors shall connect to an LCM (hardwired or pluggable) via a DALI line or direct connection and provide presence, absence and light level monitoring.

The system shall be capable of calling different scenes throughout the day, enabling different levels to be called based upon building schedules or routines. This is essential to conserve energy through management of presence, absence and daylight operations in certain areas.

Daytime, Night-time (security) and other pre-determined scenes should be configurable, and their timings programmed via the system timeclock.

The sensors shall call a pre-configured ‘Daytime’ scene during normal working hours however where applicable the same sensors should be able to measure maintained illuminance light levels.

During the evening the lighting will switch on via the occupancy sensors to a lower level, ‘Night-time’ Scene, reducing light pollution and conserving energy whilst providing suitable illuminance to carry out security checks.

# System Configuration & Control Features

Must include

* The facility to program a notional corridor for a safe exit route, for future tenant requirements.
* Automated PIR occupancy scene recalls, for day evening and night security requirements.
* Configurable occupancy sensors, definable timeout periods and lux on/lux off levels
* Graduated dimming (for daylight linking) three rows from the window.
* Mains failure recovery - the system must re-instate the lighting to the previous level prior to the mains failure (in some cases this is dependant on the behaviour of the DALI drivers).
* Fire/Emergency input – a volt free input for the connection of a fire or security alarm. When activated all lighting shall be commanded to 100% output and all local controls will be disabled for the duration of the alarm condition.
* DALI EM Emergency monitoring
* DALI luminaire driver monitoring

# System Expansion and Onward Integration

The system manufacturer shall accommodate the following features/modules to allow for integration and/or expansion.

* BMS Integration via BACnet/IP
* HVAC heating/cooling control with dedicated Fan Coil Controller
* App based software for lighting, heating, cooling, ventilation, and shading control.
* Multi-room app control via Android or iOS devices
* Bespoke control panel layouts with option for custom engraved buttons

# Emergency Testing

A Single latching fish-key connected to one of the pluggable lighting control modules should provide bus/network-wide emergency test. Emergency test mode can be set or released.

# Commissioning – Lighting System Manufacturer

The electrical contractor/installer shall supply and install all elements of the lighting control system and shall appoint the lighting control system manufacturer to commission and test the installation.

The electrical contractor/installer shall allow for attendance by the lighting system manufacturer to commission, set-to-work and adequately demonstrate the completed installation. Supporting documentation will include a completion certificate, product O&M manuals, product datasheets and all other relevant information for the on site management of the lighting control system.