Overview: Single Floor Hardwired Solution

The lighting control solution will consist of networked DALI control modules that will accommodate DALI luminaires as indicated on the drawings. Control modules shall be installed in a DINrail enclosure.

Luminaires and the controllers shall be hardwired for 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:

* DIN Rail DALI controllers **-** 2 and 4 DALI universe variants supporting a full 64 addresses per universe (128 or 256 devices per controller)
* Capacity to support DT8 Tuneable white DALI luminaires
* Ability to support DALI Emergency luminaires
* All DALI lines to accept DALI Sensors, DALI input units or DALI control plates
* Contractor/Installer test function to prove installation
* A wired lighting control network connecting all installed DALI application controllers on a floor

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.

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# 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 – Hardwired DALI

Hardwired control modules shall include the following:

* 2 Universe – Addressable DALI Controller
* 4 Universe – Addressable DALI Controller

DALI-2 compliant controller delivering dimming and control of 128 or 256 individually addressed DALI devices.

It must be possible to add DALI sensors, control plates and input modules to the DALI universes creating a complete DALI solution without the need for additional field wiring.

Each DALI universe must support 16 native DALI groups and have the ability to control extended groups, up to a maximum of 64 groups per DALI universe.

To enable future re-configuration and expansion of the system. Spare capacity (10%) on each universe should be allowed for when determining which luminaires will be served by a universe

In addition, the proposed controller shall accommodate:

* DT8 Tuneable white DALI luminaires
* DALI Emergency luminaires
* DALI Sensors, DALI input units or control plates
* Contractor/Installer test function to prove installation
* A wired bus/network connection for communication with other Lighting control modules and/or head end PC

The 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 permanent live shall supply all emergency luminaires. A single key switch shall be connected to the emergency luminaires to allow the interruption of the permanent mains supply, manually triggering a test.

# On Premis Head End PC

The system shall be able to be expanded, with the following features from the head end.

* DALI emergency error feedback
* DALI lamp and communication fault reporting
* E-mail reporting
* Multi-room APP controls via a smart phone or tablet for lighting, HVAC and shading controls
* A wide range of bespoke engraved scene plates
* Virtual scene controllers
* Schedule for emergency test events
* Schedule for lighting events
* Global events
* Log in hierarchy
* Remote access
* Luminaire dimmed status
* Back up facility

# 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.