GUIDE TO LIGHTING MANAGEMENT SOLUTIONS

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Objectives of Lighting Management Solutions

• Creating a safer and more comfortable environment for building users.
• Minimise the energy consumption
Common Strategies

- Daylight Harvesting
- Task Tuning
- MAXIMUM ENERGY SAVINGS
- Smart Time Scheduling
- Occupancy Sensing
- Personal Control
- Variable Load Shedding
Types of Lighting Management Solutions

Hard Wired Lighting Management Solution
(Contactors / Relay / 2 way switch / Intermediate Switch)

VS

Lighting Management System
(KNX, Zigbee, Bacnet)
Protocol

- KNX
- LONMARK®
- DALI
- BACnet™
- ZigBee®
- enOcean®
- Modbus
Selection Criteria Guide

• Programming Software
• Technical Support
• Pool of SI/Installers/Electrician
• Manufacturer
• Future Proof Products
• Mode of Communication
Mode of Communication

- Power Line Control
- Bus Line Control
- IP Control (Remote Access)
- RF Control
- IR Control
Types of Electronic Ballast

- Normal Electronic Ballast
- Built in Electronic Ballast
- 1-10V Electronic Ballast
- DALI Electronic Ballast
**EQ11 High Frequency Ballast: NRNC**

<table>
<thead>
<tr>
<th>EQ11</th>
<th>HIGH FREQUENCY BALLASTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increase workplace amenity by avoiding low frequency flicker that may be associated with fluorescent lighting:</td>
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<tr>
<td></td>
<td>Install high frequency ballasts in fluorescent luminaires over a minimum of 90% of NLA.</td>
</tr>
</tbody>
</table>
Dimming System

- Trailing Edge Dimmer
- 1-10V Dimmer
- DALI Dimmer
- Universal Dimmer
DALI VS Conventional Ballast

- Open Office Concept
- Future Expansion
- Flexibility
# DALI Transport & Specification

<table>
<thead>
<tr>
<th>DALI Cable Run Length</th>
<th>Recommended Minimum DALI Cable Conductor Size</th>
</tr>
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<tbody>
<tr>
<td>Less than 100 Meters</td>
<td>0.5mm²</td>
</tr>
<tr>
<td>100 to 150 Meters</td>
<td>0.75mm²</td>
</tr>
<tr>
<td>More than 150 Meters</td>
<td>1.5mm²</td>
</tr>
<tr>
<td>More than 300 Meters</td>
<td>Not recommended, avoid runs over 300 Meters</td>
</tr>
</tbody>
</table>

| Maximum number of devices  | 64                                           |
| Number of Groups           | 16                                           |
| Number of Scenes per Group | 16                                           |
| Data Cable                 | 2 wires                                      |
| Data Encoding Method       | Manchester                                    |
| Data Baud Rate             | 1200 baud                                    |
| Network Power Supply       | 16V DC 250mA                                  |
Types of Sensor

- Motion Sensor
- Occupancy/Presence Sensor
- Vacancy Sensor
- Brightness/Photocell/Daylight Sensor
Sensor Technology

Passive Infrared Red (PIR) Sensor
Ultrasonic Sensor
Dual Technology
Microwave Sensor
1-10V Dimming Sensor
Sensor Features

• Ceiling Vs Wall Mounted
• IP Rated (IP20 / IP55)
• Surface and Flush
• Integral Photocell
• Coverage: Detection Height & Angle (360, 180 deg)
• Rated Power/Current (1000W / 10A)
Mode of Communication

- Power Line Control
- Bus Line Control
- IP Control (Remote Access)
- RF Control
- IR Control
Photocell Sensor

Photocell or Brightness sensor with adjustable lux selection
T&C of the System

Commissioning is defined as the final adjustment, calibration, and tuning of the various components after they have been installed and the space is occupied. This process requires the participation of the building owner, a commissioning agent, the lighting designer, the electrical engineer, a manufacturer's representative, and building maintenance personnel.

Time Switch and Photocell

For System – Include Training of Maintenance team and Program Database
T&C of the System

Electronic Dimming Ballast: Test for full range of dimming capability. Observe for visually detectable flicker over full dimming range

Occupancy Sensor: Test sensors for proper operation. Observe for light control over entire area being covered
## EE2 Lighting Zoning: NRNC

<table>
<thead>
<tr>
<th>EE2</th>
<th>LIGHTING ZONING</th>
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<tbody>
<tr>
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<td>Provide flexible lighting controls to optimise energy savings:</td>
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<tr>
<td></td>
<td>All individual or enclosed spaces to be individually switched; and the size of individually switched lighting zones shall not exceed 100m² for 90% of the NLA; with switching clearly labelled and easily accessible by building occupants.</td>
</tr>
<tr>
<td></td>
<td>Provide auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylit areas, if any.</td>
</tr>
<tr>
<td></td>
<td>Provide motion sensors or equivalent to complement lighting zoning for at least 25% NLA.</td>
</tr>
</tbody>
</table>
## EE2 Lighting Zoning: NRNC Hotel

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<th>LIGHTING ZONING</th>
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<tr>
<td></td>
<td>Provide flexible lighting controls to optimise energy savings:—</td>
</tr>
<tr>
<td></td>
<td>All individual or enclosed spaces to be individually switched; and the size of individually switched lighting zones shall not exceed 30m² for 90% of the NLA; with switching clearly labelled and easily accessible by building occupants/management.</td>
</tr>
<tr>
<td></td>
<td>Provide auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylit areas.</td>
</tr>
<tr>
<td></td>
<td>Provide motion or occupancy sensors or equivalent to complement lighting zoning equivalent to at least 25% NLA. For guestrooms, master switch or access card switch or equiv to switch off all lights, fan, tv and airconditioning when room is not occupied will qualify as occupancy sensor.</td>
</tr>
</tbody>
</table>
Corridor / Hallway
Mosque
Lecture Halls

LOOPING TO DEWAN KULIAH 3
ENTRANCE SMART SWITCH
Thank You