ELEMENTARY
TECHNOLOGIES

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PROJECT:
FLEXISTORE – REMBRAND MALL

ELEMENTARY TECHNOLOGIES — MAKING THE COMPLEX...

Date: July 2023.

Industry: Commercial.

Area: Paarl, Western Cape .

Tag: BLE, Occupancy Control, PWM.

**Interior Corridor**

Client Requirement:

- *Automatic light control based on occupancy.*

- *Create a lighting system that is energy efficient.*

- *Easy to install to ensure low labour & installation costs.*

PROJECT SUMMARY

The primary objective for the Flexistore facility at Rembrandt Mall, in Paarl, is to implement an intelligent lighting system that reduces energy consumption while enhancing the overall lighting experience through enhanced control capabilities. This innovative store will feature an end-to-end LED linear lighting system with passive infrared occupancy sensors, all seamlessly connected through Bluetooth Low Energy (BLE) nodes forming an interconnected Bluetooth mesh network.

The lighting within the facility needed to be controlled in such a way, that light would only be triggered where the client walks. The overall electrical consumption is thus reduced while ensuring the clients' safety.

The LED luminaire is powered by a 24V DC non-dimmable driver that is converted to be dimmable through a BLE PWM controller. For modularity across the entire store, the 800W PWM BLE controller controls sections of 40m of LED strip across four different channels. The diagram below depicts the connection of the BLE PWM controller described.
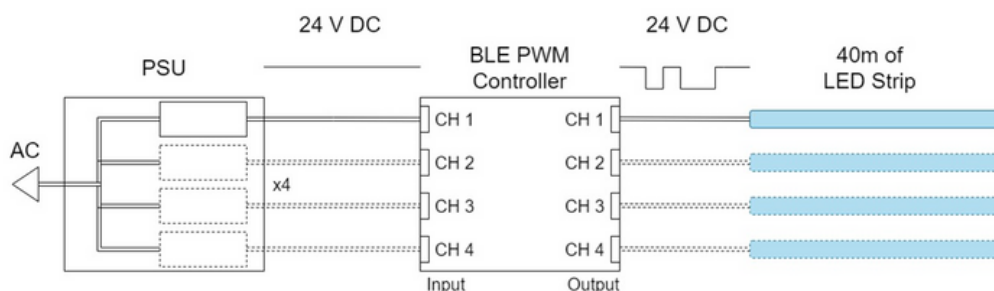
The BLE mesh network facilitates energy reduction by incorporating occupancy sensor control. The system uses Passive Infrared (PIR) sensors to detect motion, within the corridors, that trigger the PWM controllers, via the BLE mesh, to control the luminaires` light output. Further reasons why the BLE mesh is well-suited for this application is as follows:

- **Wireless connectivity** – Installation of wireless sensors and controllers reduces installation time and labour costs.

- **Range of communication** - The wireless connectivity has a wide range of up to 30m for communication between nodes with minimal signal interference.
- **Off-site commissioning** – Programming can be done off-site. This process ensures reduced time on site for the commissioner.

- **Low power consumption** – BLE nodes consume less power in its operation when compared to other wired lighting control components.

- **Reliability** – The system allows for no single point of failure in the BLE mesh network due to managed flood implementation. This means that if one node has a failure communication can circumvent that node.

- **Flexibility** – It allows for 3rd party device integration and interoperability, meaning there is no dependence on one single manufacturer and the network has greater expansion capability.

- **Scalability** – Each network can connect up to 32 000 nodes allowing for large-scale deployments.

✔ RESULTS ACHIEVED

We have optimised the control methodology for this low-foot-traffic storage facility with the following rules:

- When presence is detected, the luminaires will turn on to 100% light output. At the point of last detection, a timer of 10 mins will begin to trigger the next action. If motion is detected during this time, the timer will reset.

- After the time has elapsed, the light output will automatically dim down to 30%. And another timer will begin of 5 mins.

- If no motion is detected after the 5 mins, the luminaire will switch off.

In conclusion, the lighting control project for this Flexistore facility at Rembrandt Mall, Paarl, has successfully met its primary objectives. It has established an energy-efficient lighting and control system that is straightforward to install and has reduced labour costs. This project serves as an example of how advanced lighting controls can transform spaces into smarter, more efficient, and environmentally friendly environments, ultimately enhancing the overall customer experience.

FEATURES

- Wireless connectivity.
- Daylight harvesting.
- Occupancy control.
- Scene setting.
- Scheduling.
- Remote access.
- Security.

SYSTEM BENEFITS

- Up to 32000 nodes per network.
- Reduced installation cost.
- Reduced time on-site due to pre-programming of system.
- Self-healing mesh meaning communication can still occur if nodes fail.