

**Spicers Paper
Limited**

MELBOURNE

C-Bus Energy Management System

*Case Study*⁵



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Lighting control in one of Australia's finest paper distribution companies

Spicers Paper Limited is one of Australia's most respected distributors of fine paper. Established in Melbourne in 1896, the company's core activity is in supplying quality paper and stationery to printing firms throughout Australia and overseas. The company recently celebrated its 100th year by refurbishing its factory in Preston to cope with rapidly expanding markets in Australia and throughout Asia. A prerequisite of the refurbishment was to implement an energy saving lighting system that would complement high levels of natural light from the building's many skylights. Clipsal C-Bus was specified for the project to provide the exact level of lighting flexibility and impressive energy savings as well.

Natural and artificial lighting working together

The Spicers factory is illuminated by 220 x 400W metal halide highbays, spread over seven zones of lighting control. Within each zone, the lighting system is further divided into 6 circuits and each circuit consists of approximately 6 x 400W highbays. Each zone is capable of operating independently of each other.

Natural light from skylights located on the roof of the factory, supplements artificial lighting from the highbays. The goal of the lighting design program was to minimise the use of artificial lighting, leading to cost and energy savings for the factory, while at the same time maintaining a constant, even illumination across the factory floor of approximately 600 lux.

Variable light settings

To achieve the desired level of lighting control, each zone was programmed to operate at three settings; with all highbays On, with half lighting only and thirdly with all lights Off. However, due to the nature of the factory and the differing levels of natural light across the factory floor, individual lighting thresholds (lux) were determined for each particular zone. The calibration procedure was completed on site, by taking simple light measurements with a lux meter and then programming the C-Bus Light Level Sensors for optimum control.

To achieve this local control, 2 C-Bus Four Channel Relays were used, as well as 2 Light Level Sensors, programmed to switch lighting at the required thresholds. Each zone can also be controlled from local C-Bus Key Inputs. Each Relay output was used to drive a contactor, which in turn energised the highbay circuit.

Override option

The Light Level Sensors were also programmed so that highbays would stay Off for at least 15 minutes, after being switched Off. The deadband or margin was programmed so that rapid changes in natural lighting, such as a cloud moving over the factory and casting a shadow would not inadvertently switch the highbays.

Master switching from one location

As well as local control at each zone, a single Key Input module was programmed as a system master which was used to control lighting in the factory from a single location, while at the same time disabling the operation of the Light Level Sensors in all zones.

C-Bus was programmed to complement the factory's many skylights





Provision for accidental override

Initially all C-Bus Key Inputs were programmed as simple toggle (On/Off) switches. However to avoid accidental switching from a Key Input during normal operation, the Key Input was re-programmed only to accept a command and issue an Off command to the C-Bus, when the duration of the press on the Key Input exceeded 512mSec, without the need for any rewiring. This time delay ensures that accidentally pressing the switch could not turn lights Off. The master Key Input was programmed for a delay period of 1008mSec.

Spicers Paper Limited, Preston

Master C-Bus switch provides total control of all factory lighting from one location

Measurable energy savings

To monitor the level of energy savings two meters were installed to measure separate light zones. One of the hour run meters was installed to measure half lighting, while the other was installed to measure full lighting, each programmed to run when the lighting was off. During the 10 month period commencing July 1995 through to April 1996, the half lighting meter recorded 1,820 hours, while the full lighting meter recorded 313 hours. A total power saving of 85,700kWh, costed at 7.95c per kWh resulted in a total cost saving of \$6,800, with a projected annual cost saving of \$8,160.



2 C-Bus four channel relays were used to switch lighting at required thresholds

The Benefits of C-Bus Control

Features	Benefits
Local Control at each Zone	Ability to control lighting as required
Master Switching	Convenient, single point control for the whole factory
Multiple Light Level Sensors	Lighting switching thresholds optimised in each zone, making maximum use of natural light, leading to reduced energy costs
Programmable Switch Activation	Prevents lights from accidentally switching during normal hours

Installation Data

Project	Spicers Paper Limited, Preston, Victoria
C-Bus Electrical Contractor	APT Electrics
C-Bus Products Used	5104R Four Channel Relay 5031PE Light Level Sensor 5100PS Power Supply, 320mA 5100PC PC Interface 5031N, 5032N Key inputs
C-Bus Costs	\$7,200
Total Lighting Costs	\$15,000
Simple Payback Period	22 months

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