Introducing a **Unique Balance** in Window-Blind Automation

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A novel controller for full automation of window blinds.

Double-Skin Glass Façade buildings are becoming a fixed feature of the contemporary urban skyline. This trend, which involves an architectural shift to glass-based exteriors, considerably hastens the completion of building projects as well as providing energy-efficient solutions required for modern structures [1].

This efficiency is due to full exploitation of the natural sunlight and the isolation provided by the air sandwiched between the two glass layers which helps keep out the heat or cold. During winter time, not only is insulation provided, but the sandwiched air, warmed up by the sun, is thrown back into the facility's ventilation system [2].

This double-skin layout is typically designed for hosting motorised window-blind systems, providing superior climate control, by letting in sunlight, while blocking direct radiation. However, proper use of these blinds is at the mercy of users inside the offices or living spaces. When unattended, these blinds might, one morning, inadvertently remain in the up position, enabling the ingress of unwanted direct solar radiation or might be left down in the evening, preventing needed sunlight the next morning.

Wouldn't it be nice if we could have ultimate control over the aperture of our blinds, optimising at any given moment the delicate balance between access of the desired indirect sunlight and blocking unwanted direct radiation; and as an automated solution, to boot?

We – at Control Applications – are proud to inform you that such a solution exists.

> *The SLT is a controller designed for motorised window-blind automation which 'tracks the sun'.*

Sunlight tracking shade control

Taking advantage of its extensive experience in the design of DDC controllers and control systems for Building Management Systems (BMSs) in a broad range of fields and industries, from common HVAC systems to pharmaceutical clean rooms, Control Applications has decided to pick up the gauntlet and address this challenge, with the design of the unique Sun Light Tracker (SLT) controller. The SLT is a controller designed for motorised window-blind automation which, as suggested by its name, 'tracks the sun'. Sun-tracking is accomplished by means of programming the controller with the precise location coordinates and bearing of each of a building's facades. Using these parameters, thus factoring the building's position as a point on the globe, the SLT's advanced algorithm, running Cartesian equations, calculates the exact angle at which the sun strikes each side of the building at any given moment of the day. This of course allows us to determine the optimal aperture needed for the window-blinds system.

Utilising extraordinarily precise motors, rather than being limited to open/closed modes or to crude intervals, the SLT enables an infinitesimal level of precise control over aperture, allowing the full utilisation of the SLT's smart algorithm. Notwithstanding the automatic solution, users can manually override the control at any specific window. Equipped with a standard RS485 communication port, the SLT is integrated into the BMS infrastructure, supporting Modbus and BACnet protocols.

Ultimate Energy Efficiency

Green construction and energy efficiency are not just strong buzzwords in today's world of depleting resources. Costs spent on climate-control and lighting, especially in public and industrial facilities are significant, and solutions which optimise economising on both simultaneously are rare. The SLT is designed to do just that: To block the direct sun on hot summer days, saving significantly on HVAC expenses [1], while at the same time making sure to allow in the optimal amount of natural, indirect light.

DDC – Direct Digital Control
HVAC – Heat, Ventilation, Air-Conditioning
LED – Light Emitting Diode
SLT – Sun Light Tracker

Abbreviations/Acronyms

Three birds with one SLT

Beyond the obvious economical considerations discussed, having an entire building exterior operate automatically affords a few additional bonuses, one of which is within the realms of aesthetics. Instead of a building's façade being a hodge-podge of open and shut blinds, an automated system gives a clean and neat appearance of aesthetic uniformity. An extra perk. Our third bird is the one of external illumination: Having this integrated controllers present nearby every few motorised blinds on a building's façade has an extra upshot: fully, detailed control infrastructure for the layout of external LED illumination of a building's façade.

Conclusion

It has become quite popular to illuminate a building's façade with layouts of LED lighting, allowing the creation of intricate patterns, or at times even shapes and text. Utilising the SLT's wiring layout provides a built-in infrastructure for the control layout of such LED lighting, eliminating the need of extra wiring and installations.

References

[1] Gelesz A, Reith A. Energy Procedia 2015, 78, 555-560 http://www.sciencedirect.com/science/article/pii/S1876610215024674
[2] Poirazis H. Report on Double Skin Facades for IAE and SCH http://www.ecbcs.org/docs/Annex_43_Task34-Double_Skin_Facades_A_Literature_Review.pdf

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