



Comprehensive DALI light management at Zayed University in Abu Dhabi

University a beacon of light in more ways than one

The complex lighting solution for Zayed University in Abu Dhabi came third among the winners of the DALI Awards, which were announced at Light+Building 2012. The sophisticated project was realized by Tridonic, a company that specializes in innovative lighting concepts and light management systems. The judging panel was impressed by the optimized, daylight- and occupancy-dependent lighting control, the significant cost savings and the simple configuration of the DALI system. Tridonic used Beckhoff I/O components for designing the impressive concept.

Abu Dhabi, capital of the United Arab Emirates (UAE), is regarded as one of the most modern cities in the world. The ground-breaking ceremony for Zayed University campus in Abu Dhabi, designed to be an especially prestigious project, took place in 2009. The construction timescale was tight, because the campus was scheduled to open in October 2011. The 80 ha site features 38 buildings, including a central administration and library building and separate facilities for students.

DALI technology for motion- and daylight-dependent lighting control

The internationally operating company Tridonic, with headquarters in Dornbirn, Austria, was commissioned to implement the lighting system at Zayed University. The planning guidelines prescribed daylight- and occupancy-dependent lighting control for all building areas. "The clear choice for the light management of this complex project was the DALI protocol, which is able to pinpoint each individual lamp even in very large systems through a central monitoring system," said Mohammad Al Darwish, Tridonic Middle East Project Manager, based in Dubai.

Approximately 42,000 DALI addresses in need of control

The winDM@net light management software developed by Tridonic is a perfect match for the Beckhoff technology platform: Around 150 BC9xx0 Ethernet Bus Terminal controllers and 1,040 KL6811 DALI Bus Terminals were installed at Zayed University, together with a large number of digital and analog Bus Terminals. The KL6811 is a DALI master terminal which enables connection of up to 64 DALI slaves. In addition, Tridonic supplied around 4,700 DALI sensors for motion detection and around 2,450 DALI group controllers for automatic and manual dimming control. In total, the lighting control system comprises around 42,000 DALI addresses.

The light management software simplifies configuration and enables normal and emergency lighting DALI loops to be connected directly with the Ethernet/TCP/IP network via the BC9xx0. In this way it was possible to avoid the need for further loops, and the whole lighting system for all 38 buildings can be conveniently monitored and controlled from a single PC. Each individual Bus Terminal Controller serves as a central, yet modular gateway for the communication between the DALI and the TCP/IP protocols. The DALI sensors are connected with the central PC control unit of the light management systems via the KL6811 Bus Terminal.





View into the library at Zayed University. Tridonic received the DALI 2012 Award for the innovative, daylight- and motion-dependent DALI light management system at Zayed University in Abu Dhabi.

From a system topology perspective, the Tridonic software runs on a central PC, to which the Bus Terminal Controllers are connected via Ethernet TCP/IP and the Modbus protocol. The protocol ensures that the Bus Terminals write the DALI signals to K-bus communication standard from Beckhoff, from which the data are processed for the central PC via Modbus. The PC calculates the required control commands from the transferred data. The Beckhoff Bus Terminal Controllers were adapted for Tridonic, i.e. they run with specific PLCs that are based on TwinCAT software. In the central PC the data exchange takes place via the TwinCAT ADS interface, also from Beckhoff.

The signal acquisition system implemented at Zayed University requires no special cables, as Mohammad Darwish reports: "The system enabled us to achieve significant savings in material costs and installation times, which makes the Tridonic solution very cost-effective."

Enhanced energy savings and improved comfort

The constant light control enables the artificial room lighting to interact with the natural ambient light. To this end the ambient light sensor measures the light intensity in the room, compares it with the set brightness value and dims the

light until the light intensity matches the set value. If several DALI sensors are used in the same lighting group, dimming continues until the set light value has been reached at each sensor.

Dimming (Bright-Out/Bright-In) is based on the ambient light levels: The DALI sensor switches the lighting group off if the measured light intensity exceeds the defined threshold value for longer than the specified delay time. This also applies when motion is not detected in the room. The lighting group is switched on again if the measured light intensity falls below the set brightness value. The DALI sensors are designed to not only cover an individual point on sensor samples but a larger area. This avoids erroneous measurements caused by moving objects.

The "constant light control" function ensures that the light intensity in the space remains constant and that changes (as a result of ambient light entering the space) are compensated. The results include enhanced comfort, correct illumination at all times and, most importantly of all, energy savings.

Further Information:

www.tridonic.com

www.beckhoff.at

