Control cabinets for “intelligent street lighting”

Put an effective brake on energy costs
Intelligent control cabinets are an indispensable element of "smart" street lighting systems. They help ensure a high degree of road safety with minimum operational costs.

Intelligent control – facts and figures

- Local authorities in Germany spend about one third of their energy budget on street lighting.

- There are more than 90 million street lamps in Europe.

- A conventional street lamp has a yearly power consumption of about 670 kWh, and is out of order on an average of 15 days per year.

- In Europe alone, the power needed for street lighting totals 60 terawatt hours (60 billion kilowatt hours) per year, which corresponds to 2.5% of the entire power consumption in the EU.

- Upgrading the street lighting systems to smart technology would reduce the amount by 64% to 22 TWh per year.

- At the same time, this would cut Europe’s CO₂ footprint by 19 million tons.
Maximum road safety with minimum operational costs – this is the guiding idea behind “intelligent street lighting”. This approach involves much more than simply replacing conventional high pressure sodium lamps with LED light sources. Intelligent street lighting systems adapt lamp brightness to the prevailing conditions and ensure that the streets are illuminated only as brightly as current traffic volumes require.

The first step: LED lights instead of conventional lamps
When street lighting is getting older, its operation becomes really expensive, in terms of both energy consumption and maintenance costs. With intelligently planned modernization and renewal projects, Siemens can help local authorities upgrade their systems to energy-efficient and highly reliable lighting in a cost-effective manner. Lamp replacement alone will already generate substantial savings: The reduction in power consumption by 65 to 70% that can be achieved with our Siteco SL10 range of lamps, for instance, in conjunction with the considerable extended lifetime of LED lighting will bring noticeable relief to public budgets. The payback period for such upgrade projects is amazingly short.

The second step: Light by demand, not by the clock
To save energy, many communities power down their street lighting to half the intensity late at night – by the clock, so to speak. This means that at all other times, the streets are always brightly lit even when nobody is using them just then. A software-based operations control system can reliably avoid such situations. In combination with the Sitraffic® Concert traffic control center, the lighting management system VIA LUMEN allows needs-based switching of the street lighting installations, adapting the light intensity to the current traffic volume. Whenever the measuring stations detect only few vehicles, the brightness level is lowered accordingly. In a pilot project, the city of Düsseldorf reduced power consumption by 30% with this energy-efficient application, which earned the German Telematics Award 2012.

Essential: Modern control cabinets that offer “smart“ functions
In modernizing projects for existing infrastructure systems, control cabinets are an essential element. They must be able to support the available new energy-saving technologies such as LED light sources and intelligent lighting management. Support functions include for example passing the light switching impulses from a modern lighting control center (such as VIA LUMEN) on to the individual street lighting devices, or linking the street lighting system to the traffic control computers, when necessary. The new Siemens ISL control cabinets are perfectly equipped to handle these tasks!
Control cabinets for intelligent street lighting – flexibly customized to fit your community’s needs

The new control cabinets can be adapted perfectly to the requirements of your city or community. Siemens will supply the control cabinets in exactly the configuration needed – right up to an upgrade kit version. This high degree of flexibility is made possible by the fact that the entire design and production of the control cabinets are done in-house, i.e. Siemens controls 100% of all production steps for any control cabinet. This flexibility allows cities to continue using their existing infrastructure components. So no expensive new installations are required and previous investments keep their value, an additional benefit that further reduced the already very short payback period for projects involving the upgrade to modern intelligent street lighting solutions.

Flexible in every sense
With the new control cabinets for intelligent street lighting, the choice is yours: one or two doors, wire-bound or GPRS-based communication between control cabinet and control center, mechanical design, additional digital reporting functions, various measurements, integration of twilight sensors, link-up to Sitraffic Concert/Scala ... and much more. Please refer to the technical specifications table on page 7 for all the areas where you can choose the exact configuration of your new control cabinets.

The “heart” of the new ISL control cabinets: Simatic S7 1200
The new control cabinets are equipped with a controller from the Simatic S7 1200 family. With their excellent track record in uncountable applications across harsh industrial environments, these compact automation CPUs offer everything that you need for the intelligent control of modern street lighting systems: a wide variety of inputs and outputs, buffered real-time clock with daylight-savings-time resetting and automatic synchronization with the control center. If needed, the controller is able to operate autonomously for weeks, without any intervention from the outside. Potential-free contacts enable the control of at least ten load circuits. The load circuits can be grouped according to “half-night/full-night” operation by switching single phases on and off.

Automated adaptation to ambient light level
Every control component can be equipped with a twilight sensor, which continuously measures the ambient light intensity and reports the values to the control center. If no communication connection can be established between the control cabinet and the center, the controller derives the appropriate switching points from the typical light intensity profiles stored in the integrated astronomical calendar for each date and season.

And the list of powerful features goes on
The new control cabinets for intelligent street lighting offer even more very convenient features, some of them optional:

- Processing of additional digital input, e.g. door contact
- Integration of a wide variety of energy measuring devices for values such as active power, voltage, power factor (cosφ), and automatic reporting of the measured data to the control center
- Integration of monitored circuit breakers for the load circuits.
A wide range of housing and component options makes it possible to adapt the new control cabinets perfectly to the requirements of each application. Modern Simatic controllers ensure smooth and efficient operation.
The new control cabinets can be flexibly integrated in the existing system, but they are also equipped to exchange data with lighting management centers such as VIA LUMEN.
The new ISL control cabinets: Key data at a glance

### Technical specifications

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<th>Standards</th>
<th>• CE certificate</th>
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| Mechanical      | • Plastic cabinet with one or two doors, with shared or separate locks  
                  • Protection class IP54 or IP55  
                  • Lightweight or reinforced base |
| Control components | • Simatic S7 1200  
                         • At least ten load circuits can be connected via potential-free contacts  
                         • Load circuits can be allocated to half-night/full-night groups  
                         • Monitoring of the circuit breakers for the load circuits  
                         • Distributed real-time clock with calendar; periodic synchronization with the central control center  
                         • Autonomous operation possible |
| Twilight sensors | • Twilight sensor available as an option  
                        • Several twilight sensors can be assigned to a twilight group  
                        • Simultaneous day/night switching for all control cabinets assigned to a specific twilight group  
                        • Two independent switching thresholds for each twilight group  
                        • User-definable delay time for day/night switching event |
| Configurations  | • For each load circuit, various status parameters can be set (e.g. night-OFF, night-ON, day-ON, night-LOW, always-ON)  
                        • Weekly automatic switching  
                        • Definition of exceptions (e.g. bank holidays, street festivals, events …) |
| Energy measurements | • Measurement functions to suit the customer’s needs (e.g. active power, voltage, power factor, remote read-out)  
                           • Continuous measurements  
                           • Threshold values configurable from the control center  
                           • Monitoring of energy consumption values |
| Communications   | • Wire-bound per Ethernet/fiber-optic cable  
                        • Wireless per GPRS  
                        • Transmission of ON/OFF switching commands and processing of digital ON/OFF status feedback  
                        • Switching status logging |
The information in this document contains general descriptions of the technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.