



**SEA**

INNOVATIONS  
& EFFICIENCY



# INTELLIGENT WIRELESS CONTROL SYSTEM FOR OUTDOOR LIGHTING INFRASTRUCTURES

BASED ON GSM CELLULAR COMMUNICATION RESOURCES

SEA supplies a modern intelligent Street Light Control System (SLCS) for automation and dispatching of municipal outdoor lighting facilities. Equipment for this system is being manufactured by our enterprise and its quality has already been proved by projects in 40 Ukrainian cities.



The **main function** of SEA GSM based smart street light monitoring and control system is automatic and manual remote control of municipal public lighting technological objects.



## Automatic management

works according to customizable schedules that we create individually for each client and region, taking into account many local specifics and other factors.



## Operator control

mode allows the dispatcher, if necessary, to manually control the devices of the system power-up point.

**Additional functions** of the system are data collection and analysis concerning current condition of the following modules:

- switching point equipment;
- power supply network;
- switching equipment (starters);
- security alarm (sensor for controlling whether door is opened or closed);
- fuses on the outgoing lines;
- the data accumulated by the metering device (energy consumption values at tariffs, instantaneous power, half-hour data marts (data slices) of capacities and energies).



*All received information is stored in the data base for its processing, visualization and reports generation.*

## THE ECONOMIC EFFECT OF IMPLEMENTING SEA OUTDOOR PROGRAMMABLE LIGHT CONTROL SYSTEM IS ENSURED BY THE FOLLOWING:

- Strict compliance with the work plan, absence of human factor in automatic mode of operation;
- Availability of information feedback from the system to operators about switching to a required mode, which reduces the response time of the dispatcher in case of an abnormal situation;
- Remote control of operating modes helps in excluding trips related to checking success of on-off commands;
- Remote technical metering and accounting of consumed energy, which allows reducing working hours and transportation costs necessary for detours for taking readings;
- Ability to identify changes in energy consumption, allowing quick detection of unauthorized connections;
- Using algorithms of optimal information coding allows to reducing the size of the most frequently transmitted information packets and, thus, reducing the information transmission time;
- Ability to set individual lightening up schedules for various areas (for example, "outskirts", "suburb", "downtown", "center") with optimally selected time shifts for powering on and off.

# STREET LIGHTING MANAGING SYSTEM "SEA SLCS" IS A COMPLEX OF SOFTWARE AND HARDWARE RESOURCES INCLUDING:



Dispatcher center (server with mnemonic) + Monitoring and control system software



Cabinet "I-710" at the system start-up post with inbuilt lights managing terminal



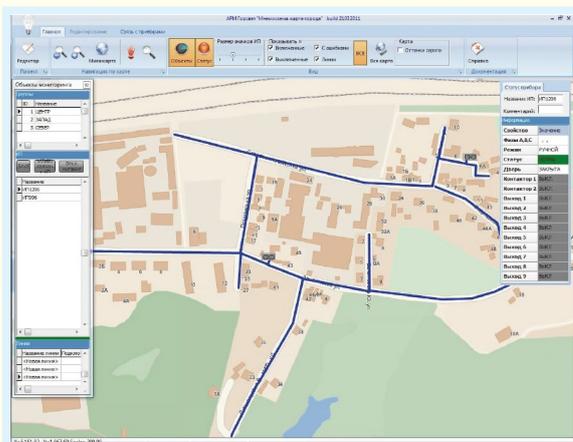
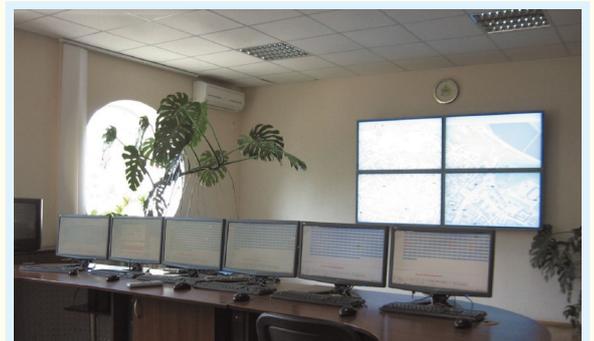
Reactive strength compensation cabinet for street lighting networks

SEA Company proposes an innovative (singular) dispatching remote control system composed of three modules for managing and monitoring road traffic, traffic lights and city outdoor lighting.

## DISPATCHER CENTER



The dispatcher center is a software and hardware complex based on personal computers, the dispatcher's workstation program and multichannel GSM terminals.



### Visualization of the state of the inclusion point carried out in the following form:

- view of all control objects on the screen (general view) - a conditional graphic designation of the element switching on with display of the contactor operating modes;
- when working with a specific terminal - in the form of a detailed electrical circuit with thorough information about the status of all its nodes at the time of the last request for their status;
- mnemonic maps of the city with marked locations of switching points and the images of outdoor lighting lines extending from them, with a color display of the current mode of operation.

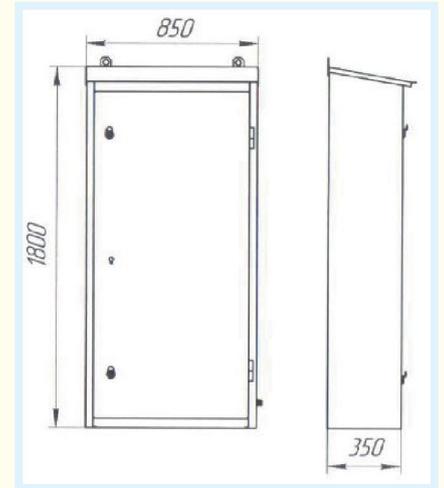


The technical electricity metering system allows to automatically send data on the current readings of metering devices via e-mail, the addressees can be the energy services of enterprises, as well as energy supply organizations.

# Cabinet "I-710" FOR CONTROL OF OUTDOOR STREET LIGHTING



– data reception, metering, and distribution of three-phase alternating current with a voltage of 380/220 V and a frequency of 50 Hz. They also ensure protection of outgoing lines from overloads and short-circuit currents.



The I-710 outdoor lighting control cabinets provide the capability to control four groups of outdoor lighting, as per the regulations specified in DBNV.2.5-28.

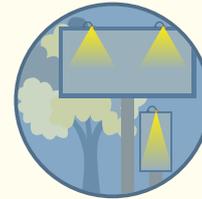


## Outdoor street lighting:

- Nighttime lighting.
- Evening lighting.



## Architectural lighting of buildings and structures



## Advertisement lighting

Electricity consumption is measured according to the project using either direct or transformer-type energy meters.

Outgoing lines are protected as follows:

- Automatic circuit breakers are used in the I-710M(N) cabinets.
- Fuses are used in the I-710 cabinets.

The cabinet allows for the separation and connection of power cables with a cross-sectional area of up to 95 mm<sup>2</sup>, inclusive, and outgoing cables with a cross-sectional area of up to 35 mm<sup>2</sup>. The input of both power and outgoing cables is made from the bottom.

The cabinets should be mounted on a foundation, either brick or other material, with a height ranging from 150 to 300 mm, or on a custom-made metal stand provided by the SEA company.

The cabinets have a climate performance according to GOST 15150 standards. The degree of protection for the cabinets (excluding the bottom) is IP54 according to GOST 14254.



The installation and configuration of meters, control blocks, and wiring of the cabinet for control blocks, as well as the type of lock to be installed, are specified after placing an order.

The control point terminal is a specialized device designed to perform automation tasks for urban lighting facilities.

The terminal, as a component of the city lighting management system, can be supplied either as part of new I-710 cabinets or for integration into existing lighting cabinets owned by the customer (for modernization purposes).

The use of French GPS/GPRS modems from Sierra Wireless in the Street Light Control System (SLCS) allows for a reduction in overall energy consumption and maintenance costs, as well as an improvement in the reliability of the telemetry system and overall management of urban lighting.



# REACTIVE STRENGTH COMPENSATION DEVICE (RSCD)

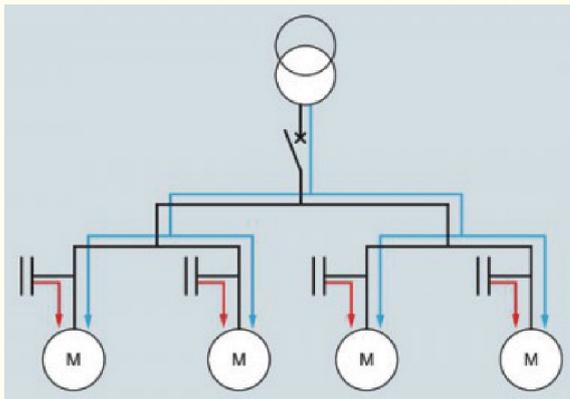
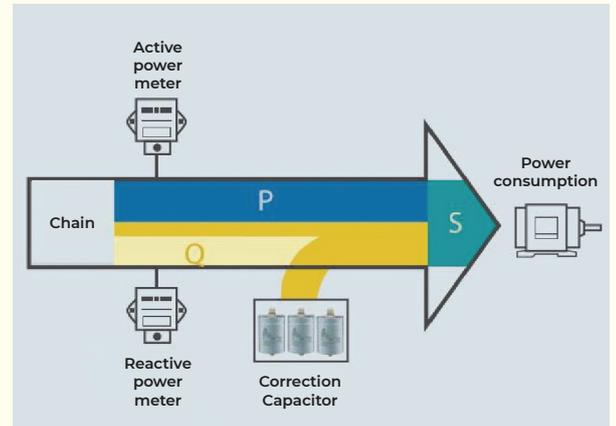
Designed for automatic power factor control in symmetrical distribution networks of three-phase AC with a frequency of 50 Hz and a voltage of 400 V.



All the main components of reactive power compensators are certified and approved for use in Ukraine.

## The use of capacitor units for reactive power compensation enables:

- 1 Relieving power transmission lines, transformers, and distribution devices.
- 2 Reducing expenses on electricity bills.
- 3 Lowering the level of higher harmonics when using specific types of capacitor banks.
- 4 Suppressing network disturbances and reducing phase asymmetry.
- 5 Making distribution networks more reliable and cost-effective.



## Advantages of RSCD in comparison with analogues:

- modular principle of construction - allows to gradually increase the installation's rated power;
- precise regulation of power factor value  $\cos\phi$  value (minimum step 2.5 kvar);
- use of specialized contactors with advanced switching contacts and current-limiting resistors, increasing the service life of contactors and capacitors.
- the use of capacitors that have the ability to self-repair after the breakdown of the insulating layer;
- application of specialized controllers for automatic regulation of the power factor  $\cos\phi$ ;
- small weight and size parameters.

## Additional functions of RSCD:

- maintain the required power factor value for the consumer in automatic mode within the range of 0.8-1 by connecting/disconnecting capacitor banks;
- perform connection and disconnection of capacitor banks stages in manual mode;
- provide current indication in the capacitor circuit, as well as fault and other types of indication provided in the automatic regulator;
- monitor the power factor value ( $\cos\phi$ );
- improve the quality of electric power directly in the networks;
- reduce overall electricity expenses; reduce the load on distribution network elements and increase their service life.

## The RSCD device includes:

a housing, a reactive power controller, an introductory switch, switches for protecting steps and a regulator, contactors for capacitors, triacs for capacitors, reactors, a power supply for triacs, capacitor banks.

By design, the RSCD cabinet is made on the basis of an electrical cabinet with a metal frame, the mounting panel containing capacitor banks, circuit breakers with fuses, as well as contactors (for the "Standard" series) or triacs (for the "Effective" series).

## The RSCD cabinet can be manufactured for:

**INTERNAL APPLICATIONS** – digital power factor controller is on the front panel of the cabinet and is visible from the outside;

**OUTDOOR APPLICATIONS** – The digital power factor controller is inside the cabinet and isn't visible from the outside.



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