

MONITORING AND AUTOMATION OF THERMAL PROCESSES IN LED LIGHTING DEVICES

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The energy efficiency of modern LEDs with the power of over 1 W reaches 30-40%, while the remaining 60-70% are consumed in heat. They need a constant heat dissipation from the crystal for stable and long-term work, that is, the radiator system. Constant overheating of light-emitting crystals in a time reduces the service life of a semiconductor device, contributes to the smooth loss of brightness with the displacement of the working wavelength, reduces energy efficiency and leads to complete degradation of the crystal.

The aim is to develop a system for monitoring thermal processes in lighting led devices to maintain optimal temperature operating conditions of the lamp and determine the effect of heat on the technical characteristics of the lamp.

The existing energy-efficient lighting and control principles used in Ukraine are analyzed. A new way of remote control of lamps with the ability to monitor the technical characteristics of a lamp without the use of wired connections between them and a distance of more than 50 meters from each other is developed. A functional scheme and algorithm of work are created. Also implemented wireless automated control and monitoring system by lighting networks. The system allows to receive, transmit and accumulate information of the technical parameters of the lamp online, such as the amount of light emitted by the lamp, the temperature of the LED crystal, the temperature of the power supply, the input voltage to the power supply, the output voltage from the power supply, the degree of illumination the external environment. Also, the system allows to adjust the voltage and current at the output of the power supply, which allows you to adjust both the amount of light and temperature on the power supply and the light crystal of the lamp.

The application allows the system to monitor and control the technical parameters of thermal processes in devices led lighting that provides support for energy efficiency lamps. Increasing the efficiency of the removal of thermal energy from the crystal requires a more detailed study.