

Economical lighting

Novel parallel LED wiring enables high power-saving potential for bright spotlights.



The transition from conventional, power-guzzling street-lighting to LED technology is already in full swing. Modernising technology pays its way. For example, in the multi-million metropolis of Berlin, the energy bill for electric public lighting amounted to around 14 million euros in 2015. New wiring developed by KIT could cut the cost of street-lighting by up to 30 to 40 per cent.

State of the art

The KIT Light Technology Institute (LTI) innovation is especially suitable for big lights upwards of 2,000 lumen. Less bright lights can currently be fed by available systems wired in series. But these are not suitable for larger applications, since the voltage limit for SELV (Safety Extra Low Voltage) is reached at a maximum of 40 LEDs, corresponding to 120 volts, from which on LEDs have to be

wired in parallel. However, wiring a larger number of LEDs in parallel is difficult because the failure of a single diode will result in the entire system or at least a part of it collapsing. Thus reliable operating of lights is not possible.

Technology

The novel KIT LED modules can remedy this. Mid-power LEDs are mounted in any number of series that are linked via parallel wiring. An upstream current regulator ensures that each LED series is supplied with the same amount of power. This is accomplished with a control loop via an averaging circuit. The respective current values are measured and reported to the control loop, which generates a mean value to which the individual rows are then adjusted. The failsafe performance of the LED-module increases because destruction of one or more LEDs doesn't cause a failure of the entire module anymore. The other LEDs continue operating.

Advantages

In addition, the use of standard components allows for cheap production. Alongside street-lighting, modules for further fields of application could be developed on the basis of the new wiring, e.g. for stadium or airport lighting or for lighting engineering technology in the medical or agricultural sectors. A prototype is available for demonstrations.

Options for companies

KIT is looking for partners to use the LED modules as well as licensees.

CONTACT

Dagmar Vössing
Head of Technology Transfer
Karlsruhe Institute of Technology (KIT)
Innovation and Relations Management (IRM)
Phone: +49 721 608-25582
E-mail: dagmar.voessing@kit.edu

PATENTS

DE102017203801B3
EP3373705A1

RESPONSIBLE INSTITUTE

Light Technology Institute (LTI)