

## PL4 and SIL4 ready - LedControl DC



LEDControl DC

In order to design machines safely and to meet the requirements of the Machinery Directive 2006/42/EC, safety functions are required in the control systems. Typically, the required Performance Level PLr is determined for each safety function. This is where the first difficulty begins during the planning and commissioning of UV systems, namely determining the severity of the injury, the frequency and duration of exposure, and how to avoid the uv hazard.

In the short term, UV exposure of the skin leads to erythema, elastosis and/or skin cancer. In contrast, UV exposure of the eye can lead to photokeratitis, conjunctivitis and cataractogenesis. If e.g. skin cancer is considered, it is a severe, usually irreversible injury.

In this context, Directive 2006/25/EC „Artificial Optical Radiation“ allows regular exposure up to a daily exposure limit of 30 J/m<sup>2</sup>. It is therefore possible to minimize the severity of the injury by the duration and intensity of exposure without having to comply with an absolute zero exposure. If the exposure limit is maintained, it is expected that healthy adult individuals can be exposed repeatedly without acute adverse effects. For example, short-term exposure may result in reversible injury such as mild erythema, i.e., sunburn, in the event of an error.

However, the delimitation is not certain and measures / safety functions are necessary in any case. For this purpose, e.g. measurements on existing installations are possible and useful.

During the planning phase, however, measurements are not possible, or can only be estimated with additional effort. Therefore, a higher, required Performance Level PLr is often demanded.

This is where the Ledcontrol DC and the extension PL+ come into play already during the planning phase! The Ledcontrol DC works with a safety extra-low voltage (SELV) of 24 VDC.

The LED modules controlled by the LedControl DC also work with SELV and can be switched off completely in the event of a fault. If the specification of a performance level is desired, this can be realized by the extension PL+. PL+ is suitable up to PL category 4, according to EN ISO 13849-1 and SIL 3 according to EN 62061, if cross-circuits in the control to the LED module as well as in the sensor circuit can be excluded.

All our LED modules can be combined with the LedControl DC and the PL+ extension.

## TECHNISCHE DATEN LEDCONTROL DC

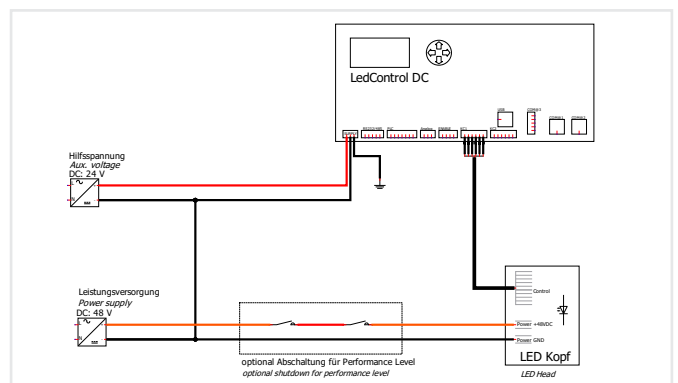
<b>Number of UVLED-Spots</b>	1 piece	<b>Switch-on time</b>	< 2 s after applying voltage
<b>Functions</b>	Dimming 2-100%, Timer and continuous operation	<b>Mounting type</b>	DIN rail
<b>Display</b>	graphical, 128 x 64 px	<b>Dimensions, approx.</b>	10,5 x 7,0 x 21,5 cm
<b>Connections</b>	Interlock	<b>Cooling</b>	passive
<b>Interface option</b>	dimming in (0-10V), common Trigger (IN/OUT), common	<b>Operating temperature</b>	5 to 40 °C
<b>Terminals, Interface option</b>	Galvanically isolated	<b>Storage temperature</b>	-10 to 60 °C
<b>Signals, Interface option</b>	24 V, 5 mA max	<b>Humidity</b>	< 80%, non-condensing
<b>Programming, optional</b>	RS485, RS232 or USB	<b>Power supply</b>	24 VDC, 10 W
		<b>Safety monitoring</b>	Over-temperature, LED N.C.

## CONNECTION EXAMPLE OF LEDCONTROL DC AND LED SYSTEM

For the operation of the LedControl DC and the LED module, one DC power supply unit each is required.

The output power of the 24V auxiliary voltage required for the LedControl DC is 10 W.

The necessary output power of the LED systems depends on the LED system and can be approx. 20 W to approx. 2000 W. The technical data for this can be found in the data sheets of the LED systems.

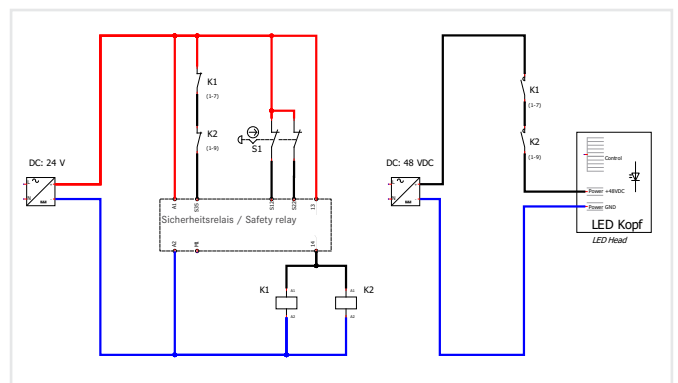


## CONNECTION EXAMPLE FOR PL KAT 4

A two-channel safety door monitoring with automatic start is shown as an example.

The advantage over the simple isolation of the DC voltages is the monitoring of the external contactors. The connection example is suitable up to category 4, PL e (EN ISO 13849-1) or SIL 3 (EN 62061), if cross-connections in the control to the actuator as well as in the sensor circuit can be excluded.

With the PL+ extension, we supply all components fully assembled for easy system integration.



## CONNECTION CONFIGURATION

The LedControl DC compatible LED systems have separate connections for power supply and control.

For this purpose, an M23 flange connector with seven poles is installed in the LED system for the power supply. The control is done separately via a 12-pin M23 flange plug.

Pre-assembled cables with sockets and open cable ends are available. The standard length is 10 m.

Other cable lengths and intermediate sockets are optionally available.

## LED SYSTEMS

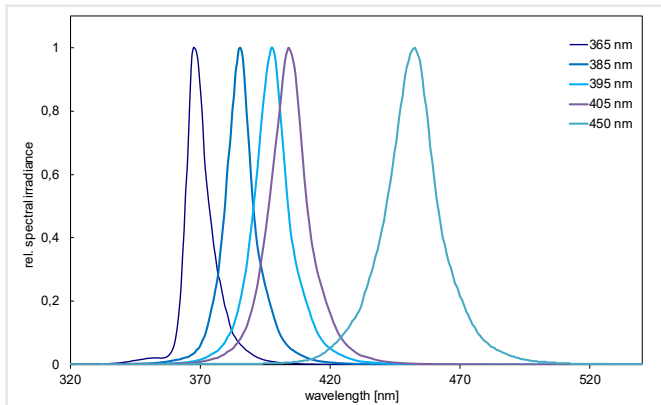
LED systems with a power of up to 2 kW can be operated on the LedControl DC. The LedControl DC offers all functionalities of our stand-alone LED controllers.

With the UV-LED series L we offer air-cooled high-power LED modules for LedControl. The SFL series is water-cooled and available with even higher power. Both series can be combined with the LedControl DC or the LedControl S. The Spot P series is designed for spot bonding and can also be combined with the LedControl DC or the LedControl S.

## COMMON TECHNICAL DATA

<b>Wavelength</b>	365, 385, 395, 405, 450 nm
<b>Emission, peak tolerance</b>	+/- 5 nm
<b>Emission, FWHM</b>	10 - 20 nm
<b>Operating temperature</b>	5 to 40 °C
<b>Storage temperature</b>	-10 to 60 °C
<b>Humidity</b>	< 80%, non-condensing
<b>Cable length</b>	10 m
<b>Classification</b>	risk group 3 according DIN EN 62471:2009-03

## UV-LED SPECTRA



Typical UV-LED spectra

## APPLICATIONS

- Industrial UV curing and bonding
- IC Encapsulation
- UV sealing
- Hairline / leak detection using fluorescence markers
- Fluorescence Spectroscopy
- Surface Inspection

## UV-LED SERIES L



## UV-LED SERIES SFL



## UV-LED SPOT P



We will be happy to support you in setting up UV workplaces and risk assessment in accordance with DIN EN 14255:2005.



## SAFETY

The equipment contains LEDs that emit UV-A radiation and blue light. UV radiation is invisible. The light you see is just luminescence caused by the UV. Mostly, luminescence is much weaker than the exciting UV.

UV-A light may lead to cataract formation in the eye lens and to photo-retinitis. Always use proper UV protection goggles when operating the device. The UV-A also causes pigmentation and aging of the skin. Please use proper clothing, gloves, and/or other personal sa-

fety equipment depending on exposure. Avoid irradiating skin or eyes directly! UV irradiance in the spot is several hundred times higher than that of sunlight!

This device is classified to risk group 3 (High Risk) according to DIN EN 62471:2009-03 "Photobiological safety of lamps and lamp systems."

For protection, the operating staff should not look into the LED and should not expose their skin continuously to UV/VIS radiation.

## REMOTE OPERATION

The LEDControl can be controlled via the rear programming interface (USB, RS485 or RS232). Communication takes place as ASCII communication, which is illustrated below using the example of „Switching on“:

- control transmits: LOnOff: 1!
- LedControl answers: LOnOff: 1 (CRC-16)

Each channel can be individually controlled. The LedControl sends only when requested by the controller.

Via the other interface option LED powers can be set together for all channels (0-10V), LEDs on / off (trigger IN 24V) and the status (trigger OUT 24V) can be set and queried. This option is suitable for simple system integration with common signals.

### Example commands:

- LANzahlICH? Request number of channels
- LANzahlICH? Request connected channels
- LSelect: 0 1 !? Set active channels
- LPowerSet: 000.0 033.7!? Set power
- LTriggerOnOff: 1 1!? Set trigger input active
- LFirmware? Request firmware version



programming software

## PART NUMBERS

<b>LEDControl DC</b>	860609DC	<b>Interface option (I/O)</b>	860609-CP
<b>Extension PL+</b>	860609PLDC	<b>Programming interface RS485</b>	860609-RS485 *
<b>Cable set 10 m</b>	860609CDC	<b>Programming interface RS232</b>	860609-RS232 *
<b>UV-LED Series L xxx nm</b>	see sep. data sheet	<b>Programming interface USB</b>	860609-USB *
<b>UV-LED Series SFL xxx nm</b>	see sep. data sheet	<b>Test and control software</b>	860609-SW
<b>UV-LED Spot P xxx nm</b>	see sep. data sheet		

\* Includes Interface option (I/O)

## SCOPE OF DELIVERY

LedControl DC, interface assignment, operating instructions, options if applicable.

Please specify LED type, wavelength, if applicable also optics and options.