

Air-cooled UVLED series L



With the UV LED series L, we combine the benefits of the UV LEDs compared to the UV lamps; these are initial start, dimmability, long service life and a lower heat input with an economical UV LED system.

Irradiances of up to 5,5 W/cm² are reached on the surface. The high irradiance enables short processing times. For different applications, wavelengths of 365nm, 385 nm, 395 nm, 405 nm, and 450 nm are available. That way, the UV LED series L can be optimal customized for the requirements of the photoinitiator.

All wavelengths are available in five differently sized illumination areas from 10 x 100 mm, and 30 x 30 mm up to 200 x 100 mm. We are also happy to manufacture custom sizes and UVB and UVC LED modules. Ask us!

The cooling of the modules is taken out by the fan on the backside. The largely dimensioned cooling minimizes the noise emission and the thermal drift.

Because of the modular construction it is possible to connect different UV LED heads to the control unit LEDControl.

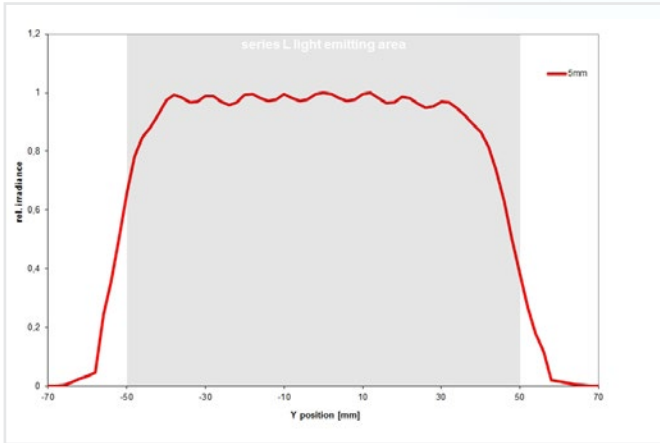
You will benefit from the modular and exchangeable UV LED series.

By means of the intelligent control unit, you can set the power to between 2% and 100%. Short clock cycles with the highest precision are possible due to the trigger input and the internal timer.

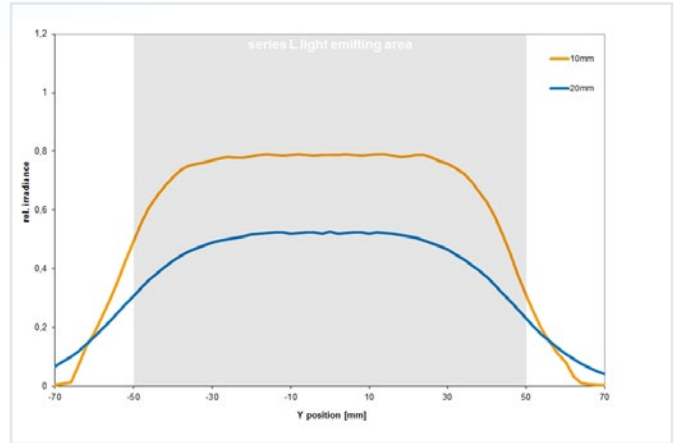
With the multi-channel LEDControl 5S, up to 5 UV LEDs can be controlled individually. The LEDControl is cascadeable and can be configured as master or slave. Remote control can be done via RS485, USB or RS232 for each channel and enables the use in industrial production. Other digital and analog inputs are also available as an option.

Furthermore, the control unit features internal fault detection and thus ensures the utilization in the industrial production. For the monitoring of UV LEDs we recommend our calibrated UVA+- sensors. These are available as PLC sensors and hand radiometers.

UNIFORMITY OF IRRADIATION



Uniformity vs. distance along Y axis in a distance of 5 mm



Uniformity vs. distance along Y axis in a distance of 10/20 mm

IRRADIANCE VS. DISTANCE

5 mm distance	5,5 W/cm ²
10 mm distance	4,6 W/cm ²
15 mm distance	3,8 W/cm ²
20 mm distance	3,1 W/cm ²
30 mm distance	2,1 W/cm ²

Measured centrally under UV-LED module XS-HO, wavelength 385 nm, power 100%, reference: bottom surface

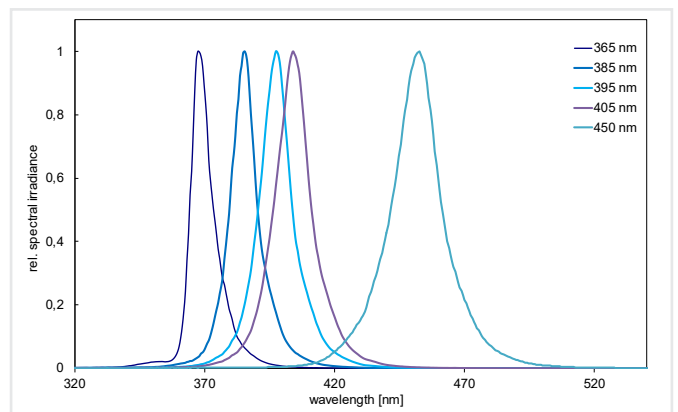
IRRADIANCE XS-HO

365 nm	4000 mW/cm ²
385 nm	5500 mW/cm ²
395 nm	5000 mW/cm ²
405 nm	5000 mW/cm ²
450 nm	5000 mW/cm ²

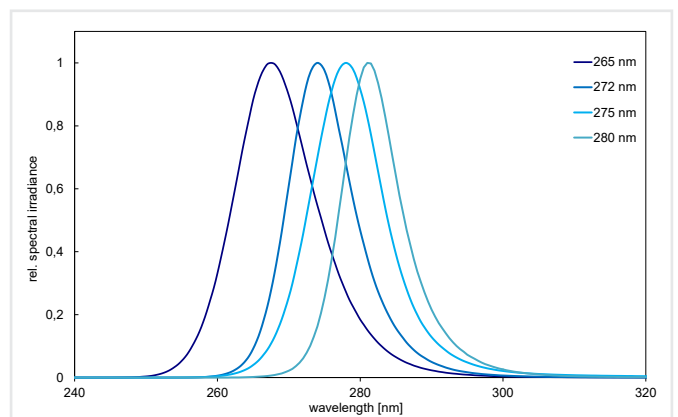
IRRADIANCE XS, S, M, L

265 nm - 285 nm	~2-10 mW/cm ²
365 nm	1000 mW/cm ²
385 nm	1400 mW/cm ²
395 nm	1400 mW/cm ²
405 nm	1400 mW/cm ²
450 nm	1400 mW/cm ²

UV-LED SPECTRA



Typical UV-LED spectra for UVA and VIS



Typical UV-LED spectra for UVB und UVC (customized)

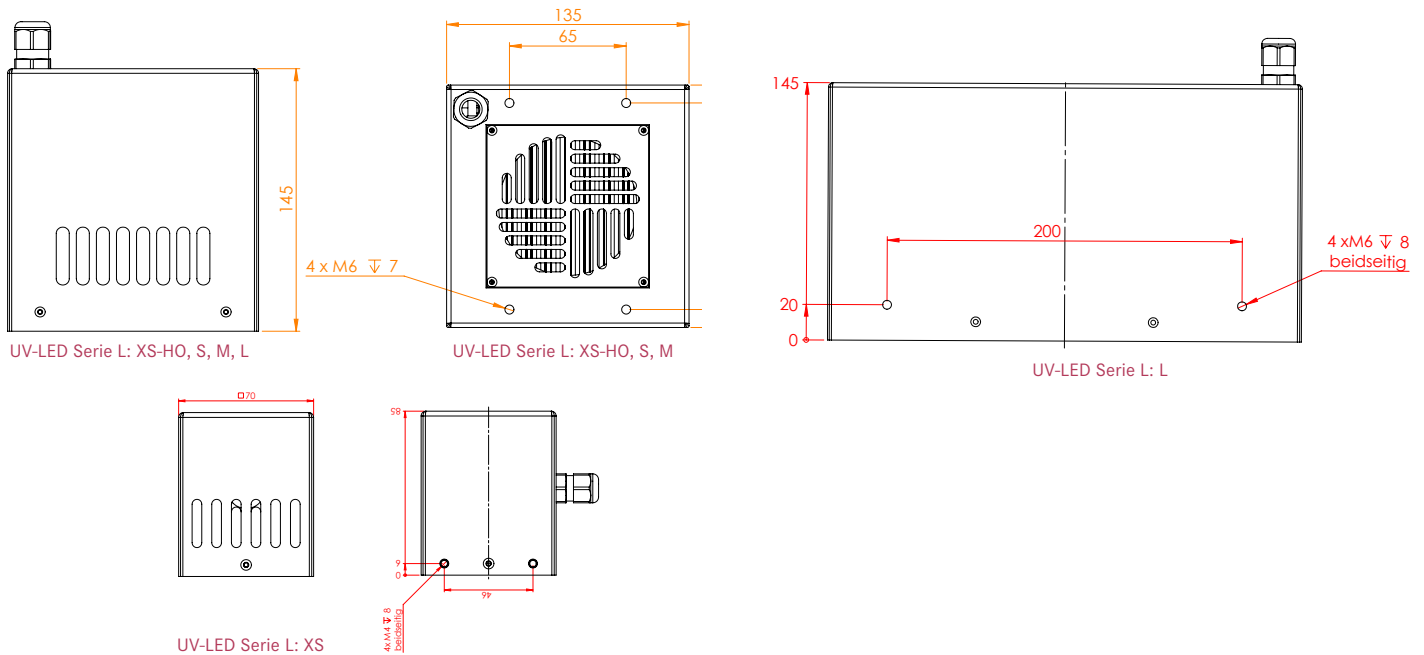
APPLICATIONS

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

COMMON TECHNICAL DATA LED MODULS

Wavelength	365, 385, 395, 405, 450 nm	Operating temperature	5 to 40 °C
Emission, peak tolerance	+/- 5 nm	Storage temperature	-10 to 60 °C
Emission, FWHM	10 - 20 nm	Humidity	< 80%, non-condensing
Uniformity	90%, centric, 10 mm distance drop down to edge (s. fig.)	Cable length	3 m, up to 10 m (opt.)
Cooling	air-cooling	Classification	risk group 3 according DIN EN 62471:2009-03

DIMENSIONS



COMMON TECHNICAL LEDCONTROL

Functions	dimming 2 to 100% timer, continuous operation Master /slave mode	Programming, optional	RS485, RS232 or USB
Connections	Interlock	Dimensions	305 x 358 x 145 mm
Interface option	dimming in (0-10V), common Trigger (IN/OUT), common	Cooling	Aircooling
Terminals, Interface option	Galvanically isolated	Operating temperature	5 to 40 °C
Signals, Interface option	24 V, 5 mA max	Storage temperature	-10 to 60 °C
		Humidity	< 80%, non-condensing
		Power (el.)	dep. on type, 100 W - 2000 W
		Internal security circuit	Over-temperature, LED N.C.

LEDCONTROL S AND LEDCONTROL DC

For the control of the UV LED Serie L, we offer the LedControl S as a desktop device or the LedControl DC for a top-hat rail mounting. The LEDControl DC is optimal for integration into a PLC and achieves a high performance level. For this purpose we deliver the UV area lamps with corresponding interfaces.



LedControl DC

TECHNICAL DATA

SERIES L: XS

Emitting area	30 x 30 mm
Dimensions	70 x 70 x 85 mm
Power (el.)	50 W

SERIES L: XS-HO

Emitting area	100 x 10 mm
Dimensions	135 x 135 x 145 mm
Power (el.)	200 W

SERIES L: S

Emitting area	100 x 50 mm
Dimensions	135 x 135 x 145 mm
Power (el.)	250 W

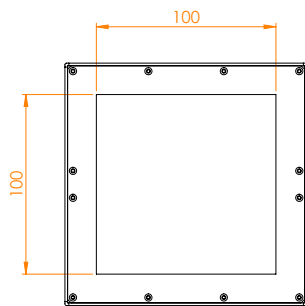
SERIES L: M

Emitting area	100 x 100 mm
Dimensions	135 x 135 x 145 mm
Power (el.)	500 W

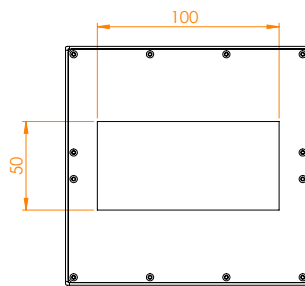
SERIES L: L

Emitting area	200 x 100 mm
Dimensions	267 x 135 x 145 mm
Power (el.)	1000 W

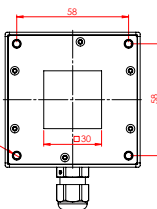
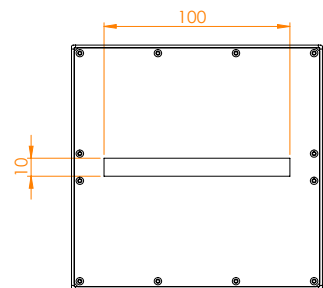
EMISSION WINDOWS



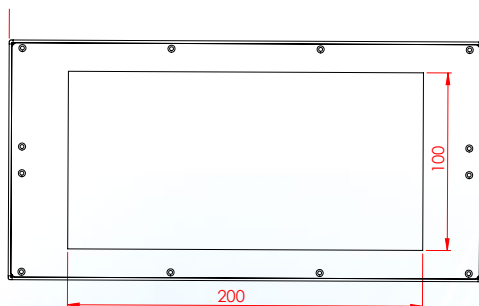
UV-LED L-M



UV-LED L-S



UV-LED L-XS



LEDCONTROL S WITH SAFETY OPTION PL-READY

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/m². 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.

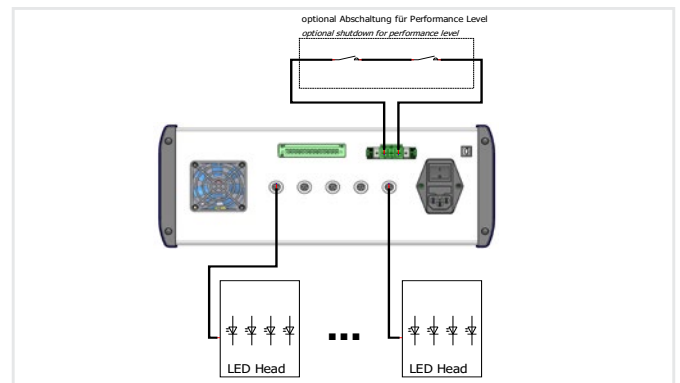
During the planning phase, however, measurements are not possible, or can only be estimated with additional effort. Therefore, a higher, required Performance Level PLr is often demanded.

The PLready safety option works with a safety extra-low voltage (SELV) of 48 VDC, which is safely isolated by an external circuit and can switch off the LED modules completely in the event of a fault.

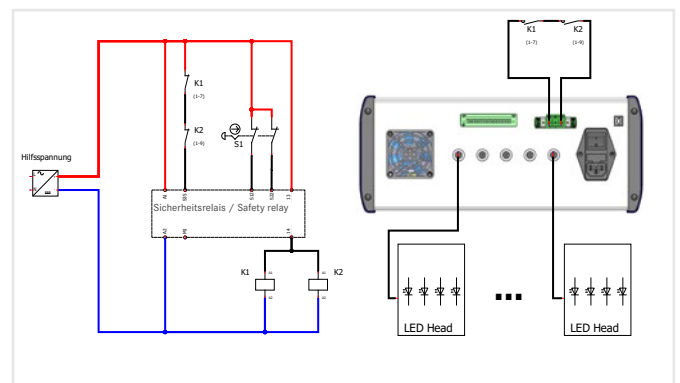
If the specification of a performance level is desired, this can be realized by the extension PL+. PL+ is suitable up to PL category 4, according to EN ISO 13849-1 and SIL 3 according to EN 62061, if cross-circuits in the control to the LED module as well as in the sensor circuit can be excluded.

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.



Connection example



Connection example for PL KAT 4

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 and allows cascading of any number of LedControl.

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

UV-LED L-XS-HO xxx nm	860615-LXSHA-xxx nm	Interface option (I/O)	860609-CP
UV-LED L-XS xxx nm	860615-LXS-xxx nm	Programming interface RS485	860609-RS485 *
UV-LED L-S xxx nm	860615-LS-xxx nm	Programming interface RS232	860609-RS232 *
UV-LED L-M xxx nm	860615-LM-xxx nm	Programming interface USB	860609-USB *
UV-LED L-L xxx nm	860615-LL-xxx nm	Test and control software	860609-SW
LEDControl S	860609B	Connection cable, 3 m	860609C
LEDControl 5S-500W	860610B5-500W	Cable, each add m	86060X-m
LEDControl DC	860610DC	Foot switch	860611
Wall angle for LEDControl	860609-WA	UV safety goggles	918800
Safety option PLready PLready	860609PL		

* Includes Interface option (I/O)

SCOPE OF DELIVERY

UV-LED Modul, LEDControl, cable 3 m, manual. Optional: Remote example software for instant testing, if ordered

with programming option. Please specify wavelength, optics and options.