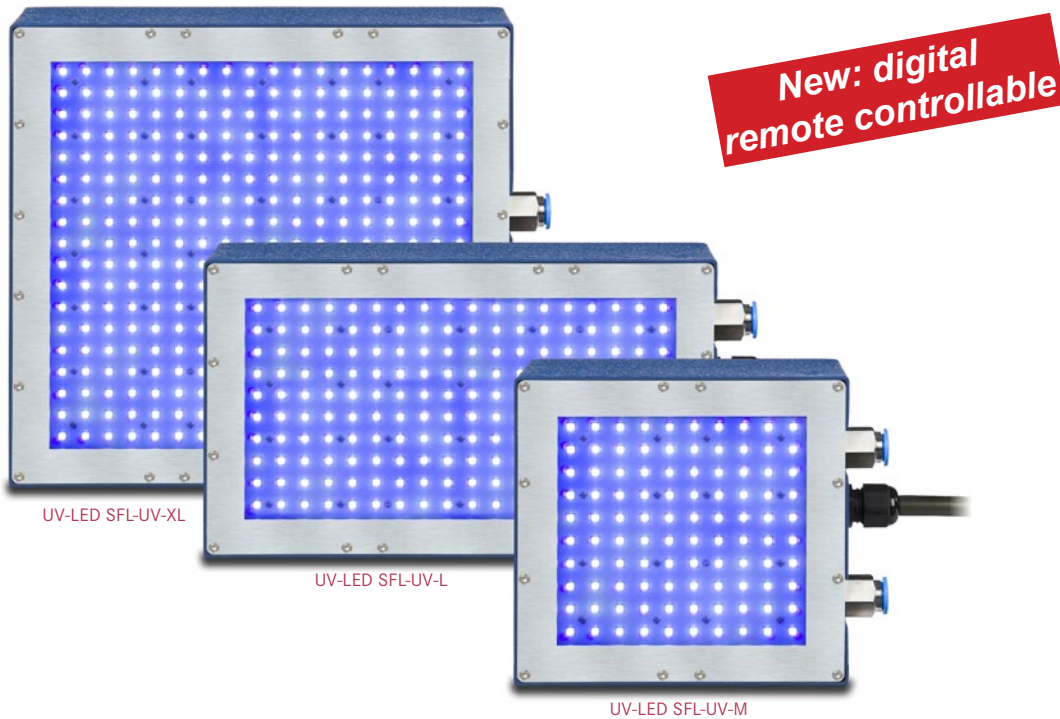


Uniform surface Led series SFL-UV



High UV irradiance combined with a uniform irradiated area is the key feature of the surface LED series SFL-UV. The SFL-UV modules are water-cooled high-power UV LED sources with an intelligent LED driver. The absence of ineffective infrared radiation reduces the heat compared to conventional UV lamps.

Three standard sizes are available with light-emitting areas of 100 x 100 mm to 200 x 200 mm. Customized sizes are available on request.

Independent of size, we offer two versions. The HO versions reach high irradiance of up to 5500 mW/cm², while the ECO versions still offer up to 2000 mW/cm². Both irradiances are measured at a distance of 10 mm to the emitting window.

The high irradiance allows extremely short processing times. Wavelengths of 365, 385, 395, 405, and 450 nm are available for many different applications.

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.



Surface LED SFL-UV-M with control unit LEDControl

With the multi-channel LEDControl 5S, up to 5 UV LEDs can be controlled individually. The LEDControl S is cascable 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.

A timer for the irradiation times between 0.01 s and 9999 s is already integrated. Optionally you can choose between continuous or triggered operation.

TECHNICAL DATA LED MODULS

Wavelength	450, 405, 395, 385, 365 nm
Irradiance 450 nm	5000 / 1400 mW/cm ²
Irradiance 405 nm	5000 / 1400 mW/cm ²
Irradiance 395 nm	5000 / 1400 mW/cm ²
Irradiance 385 nm	5500 / 1400 mW/cm ²
Irradiance 365 nm	4000 / 1000 mW/cm ²
Emission, peak tolerance	+/- 5 nm
Emission, FWHM	10 - 20 nm
Uniformity	>90%, typical in a distance of 10 mm with 5% std. deviation
Cooling water temperature	min 18 °C, non-condensing max 40°C
Cooling water pressure	< 4 bar
Operating temperature	5 to 40 °C
Storage temperature	-10 to 60 °C
Humidity	< 80%, non-condensing
Internal security circuit	Over-temperature
Optical feedback, opt.	internal and external sensor
Cable length	3 m, up to 10 m (opt.)
Classification	risk group 3 according DIN EN 62471:2009-03

TECHNICAL DATA SFL-UV-M

Emitting area, SFL-UV-S	100 x 100 mm
Dimensions	135 x 135 x 75 mm
Power HO version	2000 W
Power ECO version	500 W
Cooling water flow	typical 5 to 1 l/min

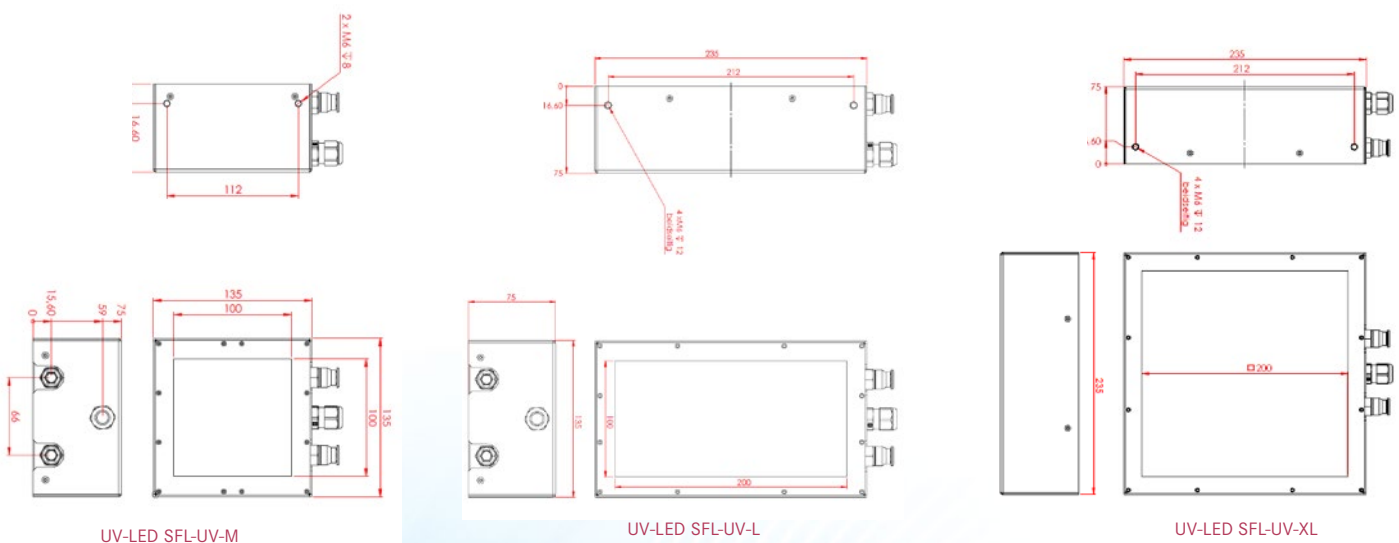
TECHNICAL DATA SFL-UV-L

Emitting area, SFL-UV-S	200 x 100 mm
Dimensions	235 x 135 x 75 mm
Power HO version	3800 W
Power ECO version	1000 W
Cooling water flow	typical 12 to 2,5 l/min

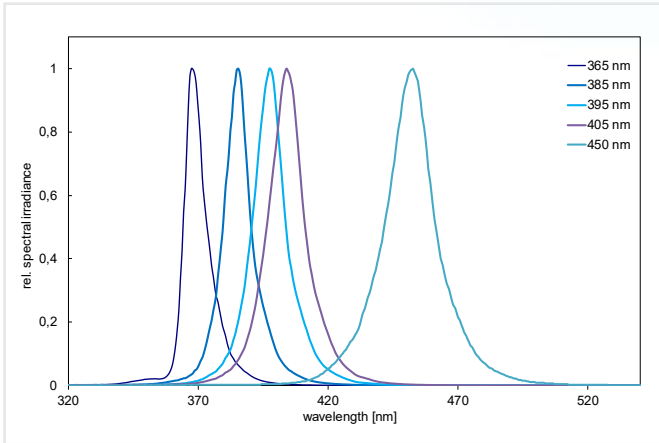
TECHNICAL DATA SFL-UV-XL

Emitting area, SFL-UV-S	200 x 200 mm
Dimensions	235 x 235 x 75 mm
Power HO version	7700 W
Power ECO version	1900 W
Cooling water flow	typical 25 to 5 l/min

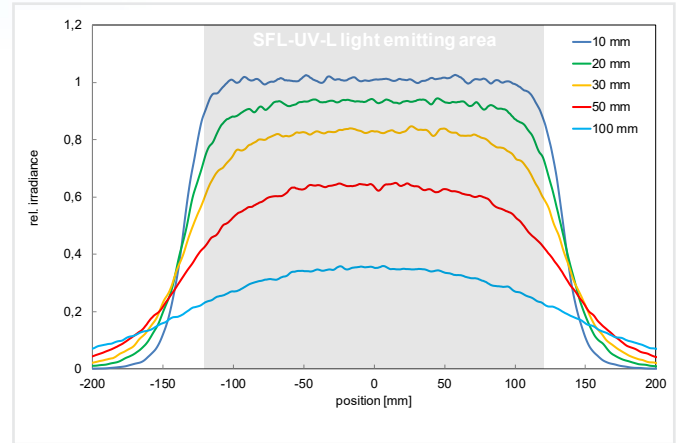
DIMENSIONS



SPECTRA AND UNIFORMITY



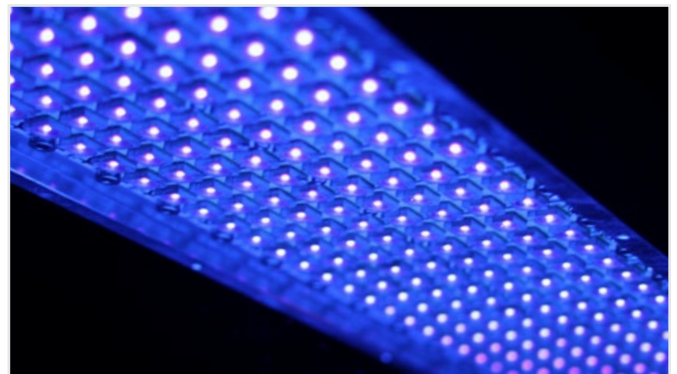
Typical UV-LED spectra



Uniformity vs. distance along X axis for SFL-UV-M

TECHNICAL DATA LEDCONTROL

Functions	2 to 100%, each spot separate timer, continuous operation	Power (el.)	dep. on type, 500 W - 6500 W
	Master /slave mode		100 - 500 W LedControl 5S
Display	graphical, 128 x 64 px	Mains < 2500 W	100 - 240 V, 50/60 Hz
Connections	Interlock	Mains > 2500 W	3 x 340-550 VAC, 50/60 Hz
Interface option	dimming in (0-10V), common	Internal security circuit	Over-temperature, LED N.C.
	Trigger (IN/OUT), common		
Terminals, Interface option	Galvanically isolated		
Signals, Interface option	24 V, 5 mA max		
Programming, optional	RS485, RS232 or USB		
Cooling	Aircooling		
Operating temperature	5 to 40 °C		
Storage temperature	-10 to 60 °C		
Humidity	< 80%, non-condensing		



Surface LED SFL-UV-L ECO with 385 nm

APPLICATIONS

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



Uniformity in large distance

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

SFL-UV-M ECO xxx nm	860616-M-xxx nm
SFL-UV-L ECO xxx nm	860616-L-xxx nm
SFL-UV-XL ECO xxx nm	860616-XL-xxx nm
HO Version (Option)	560609-HO
LEDControl S	860609B
LEDControl DC	860610DC
Wall angle for LEDControl S	86060X-WA
Foot switch	860611
Radiometer and sensor	821201 / 811045

Interface option (I/O)	860609-CP
Programming interface RS485	860609-RS485 *
Programming interface RS232	860609-RS232 *
Programming interface USB	860609-USB *
Safety option PLready PLready	860609PL
Test and control software	860609-SW
Connection cable, 3 m	860609C
Cable, each add m	86060X-m
UV safety goggles	918800

* Includes Interface option (I/O)

SCOPE OF DELIVERY

SFL-UV module, LEDcontrol, cable 3 m, manual,

UV sensor & manufacturers certificate of calibration if ordered optical feedback option

Remote example software for instant testing, if ordered with programming option

Please specify wavelength, optics and options.



UV-LED SFL

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.

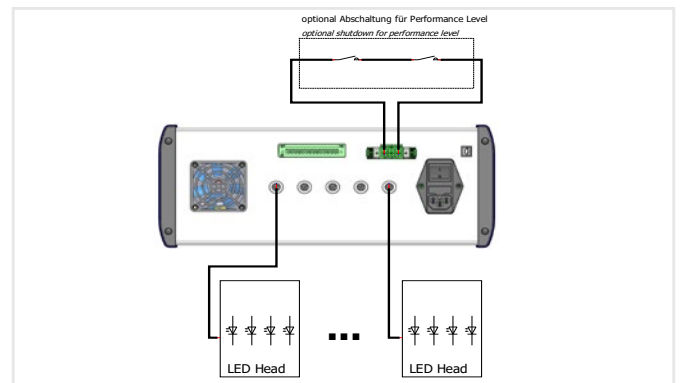
During the planning phase, however, measurements are not possible, or can only be estimated with additional effort. Therefore, a higher, required Performance Level PLr is often demanded.

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.

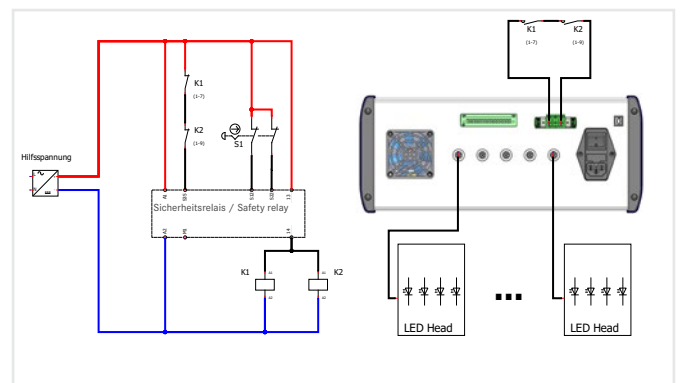
If the specification of a performance level is desired, this can be realized by the extension PL+. PL+ is suitable up to PL category 4, according to EN ISO 13849-1 and SIL 3 according to EN 62061, if cross-circuits in the control to the LED module as well as in the sensor circuit can be excluded.

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

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 safety 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.

We will gladly assist you with UV job security and risk assessment according to EN 14255:2005.



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