

# LED illumination for image processing and microscopy

Versatility, durability and good value are the key features of our LED lighting units. Exchangeable attachments, such as lenses and diffusers, optimise luminous efficiency and make it easy to cater for a variety of applications.

The LED lighting units are developed, manufactured and serviced exclusively in Germany, allowing us to guarantee a high standard of quality and short delivery times.

Our lighting may not be the most important aspect of your application, but it is definitely the most useful part.

## RING-LIGHTING

Ring-lights are the most popular form of illumination. Fixed to the object lens or to the microscope, they provide shadow-free incident light. Five sizes, in sturdy aluminium housings, cover a wide range of applications:

### LR-14/40

The smallest ring-light in the range is supplied with a diffuser. This miniature design permits working distances down to 30 mm.



### LR-25/60

This compact ring-light has an external diameter of 61.5 mm and contains 24 LEDs. It is ideal for small-scale optics such as measurement microscopes.



### LR-45/75

This light is specially designed for restricted spaces. With an internal diameter of 45 mm, the external diameter is only 76.5 mm.



### LR-45/90

A compact and powerful light, this is the all-purpose ring-light. With 48 LEDs arranged in a double row, there is plenty of light in reserve.



### LR-60/110

This light was developed for large optics and microscopes. Can be used with commercial stereo microscopes and optics with a diameter of up to 66 mm. The high illumination level from the double row of 72 LEDs allows images to be recorded even at high magnification.



LED-Ring	LR-14/40	LR-25/60	LR45/75	LR45/90	LR60/110
Internal Ø / mm	14,0	25,0	45,0	45,0	60,0
Shoulder Ø / mm	18,0	35,0	45,0	50,0 / 66,0	66,0
External Ø / mm	40,0	61,5	76,5	91,5	111,5
Height / mm	22,0	23,0	23,0	23,0	23,0
kLUX / LED-white*	3,5	9,4	9,4	17,0	21,0
Switchable segments	no	no	no	yes	yes
PS voltage / VDC	12,0	12,0	12,0	12,0/24,0**	12,0/24,0**
Current cons. / mA	60	160	160	320	480
LED	white	white, UV, blue, green, red, IR			

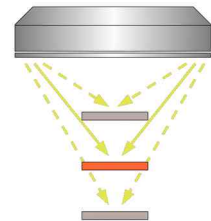
\* values in Lux measured by the reflective method, with working distance = 100 mm  
\*\* when ordering, please specify, 24 V connection only for OEM version

## Attachments for Ring-lighting

### Lens attachments focus the light



Exchangeable lenses are used to concentrate the light power at a specific working distance. In this way, the light is not dissipated but focused at the point where it is needed: in the centre of the field of view. For the most common working distances, the following lenses are available:



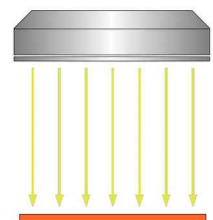
Nominal	working range
WD = 50 mm	40 - 80 mm
WD = 100 mm	80 - 150 mm
WD = 200 mm	150 - 240 mm

### Diffusers for uniform emission



Diffusers are used for homogenous illumination of surfaces. They can be used for working distances from 150 mm upward.

Note: For long working distances above about 300 mm, clear acrylic glass can also be used, to increase the light intensity.



### Polarised filters to prevent reflections



The POL-SET is used to remove annoying reflections from shiny surfaces. The POL-SET is fitted in front of the ring-light, and is combined with a lens or a diffuser. SETs are available for ring-lights LR-45/90 and LR-60/110.



## Side-lighting

The **LSP-Spot** is used in microscopy or for machine illumination. If required, the spotlight can be supplied with a stand (swan-neck 450 mm, 140 mm diameter circular baseplate).

**NEW:** The two-parts stand can be used as a table tripod or a surface-mounted illuminator.

Lighting intensity (kLux)	9.4
Current (mA) at 12 V	160
Øext / H (mm)	51.0 / 25.0
LED	white, UV, blue, green, red, IR



The **FL50x50 Surface Light** is used for intense incident illumination. It can be supplied with clear glass or diffusing insert.

Lighting intensity (kLux)	14.0
Current (mA) at 12 V	240
W / D / H (mm)	77.0 / 57.0 / 25.0
LED	white, UV, blue, green, red, IR



## Back-lighting

Several homogenous lighting panels are available for back-lighting applications.

Panel	Illum. Area (mm)	Intensity (kLux)	W / D / H (mm)	Current at 12 V (mA)
DL-2525	25 x 25	1,0	54,0 / 60,0 / 20,0	160
DL-5050	48 x 48	2,7	77,0 / 57,0 / 25,0	240
UF-9060	90 x 60	4,5	128,0 / 103,0 / 20,0	200
UF-180120	180 x 120	16,0	223,0 / 165,0 / 20,0	700



## Coaxial light

**NEW:** A splitting mirror is used to connect a 40x40 mm LED panel into the optical path of any optic. The type of illumination is ideal for smooth reflective objects. The COAX-40 can be attached to optics with diameters up to 66 mm.

Current (mA) at 12 V	240
W / D / H (mm)	60,0 / 92,0 / 58,0
LED	white



## DFRL-60 dark-field lighting

The ring-light unit provides homogenous illumination of an area 60 mm in diameter. If the object under observation has any hollows and/or raised areas, they will be illuminated and highlighted. The dark-field effect requires a short working distance.

Current (mA) at 12 V	300
Øouter / Øinner / H (mm)	105,0 / 60,0 / 17,0
LED	white



## Connectors

### OEM version

If a 12 V or 24 V voltage supply is available, the LED lights can be supplied with a connecting cable (2.0 m to 10.0 m) and connectors of the client's choice.



### Controller NT-I

The new controller comes with many unique advantages:

- Optical feedback of adjusted brightness
- Storing the last brightness
- Powersaving mode

Max.output current	1200 mA
LED output	1
Ø / H (mm)	71,0 / 45,0
Input voltage	100-230 VAC

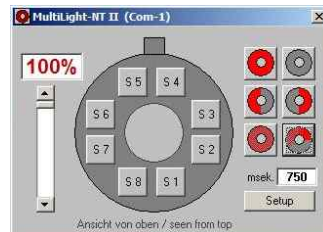


### Controller NT-II

For ring-lights LR-45/90 and LR-60/110, individual segments of the LED rings (8 segments) can be activated, in addition to varying the brightness.

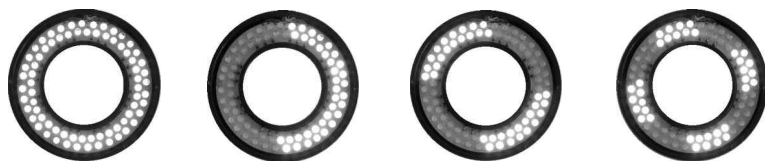
If objects with hollows and/or raised areas are under observation, their edges will show up more clearly when lit from one side than under even illumination.

Settings can be selected directly on the equipment or via a PC program. The scope of supply includes a free software program allowing all the segments to be individually switched.



The following modes can be selected on the controller:

- Full circle
- Semicircle
- 2 quadrants
- 1 quadrant
- Automatic



Segment samples

### NEW:

- The new vibration feedback makes it much easier to use the equipment: If the mode is changed, or the minimum or maximum brightness is reached, the unit emits a vibration signal. The user no longer needs to look away from the monitor or the eyepiece in order to check the controller setting.
- The user can also set up and save options for initial brightness, and for resolution per rotary pulse.

Max. output current	8 x 150 mA
LED output	2 (switchable)
W /DT / H (mm)	120,0 / 155,0 / 45,0
PC Interface	RS-232 (USB with Adapter)
Input voltage	110 – 230 V AC

## CP pulse generator

The single-channel CP pulse generator is used to synchronise image recording and lighting for moving images. Timing is determined by a trigger signal. The pulse on-time is set to 10%. If the LEDs are pulsed, they deliver three times as much light as when they are operated continuously.



Operating voltage	24 V DC (Power supply not supplied)
Max. pulse current	3,2 A
Trigger	24 V (rising edge)
Pulse times	50 µsec - 300 msec (selectable with DIP-switch)
W / D / H (mm)	55 x 25 x 80

## The light box

The complete kit contains all necessary components to cater for most common lighting situations:  
Digital power supply NT-II, RS-232 cable, and software  
Manual and PC control



- Digital power supply NT-II, RS-232 cable, Software, manual and PC control
- Ring-light model LR-45/90  
Incident light for full circle and segmented illuminated
- Lens for WD =100 mm and diffuser  
Focused and diffuse incident light
- Pasive dark-field ring  
Dark-field illumination
- Aluminium housing

**You can buy the kit at a special price of only € 565.- net.**

## Installation

There are a number of ways to install the lighting in your optic:

- All lights have M4 threads on the rear face.
- All ring-lights also have three concentric threads (arranged at intervals of 120°); to accommodate optics up to the internal diameter of the light or its extended shoulder.

**NEW:** the lights can be offset by up to 150 mm from the optic using the installation kit. The kit is designed for ring models LR-45/90, LR-60/110 and the dark-field ring, model DFRL-60.



Rear face of ring-light



Installations kit on dark-field light

## Further details

### Application of light colours

White LEDs / 5200 Kelvin

The most commonly-used colour in lighting technology. For microscopy and when using colour cameras.

Ultraviolet (UV) LEDs / 365nm

For detection of fluorescing adhesives, particles and paints.

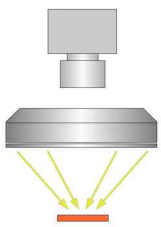
Coloured LEDs (blue / 470 nm, green / 565 nm, red / 634 nm)

For special applications e.g. in image processing and to increase contrast when using software cameras.

Infrared (IR) LEDs / 885 nm

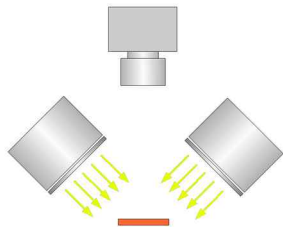
IR LEDs are mainly used together with IR-sensitive cameras. This combination eliminates the influence of daylight.

### Configuration and application



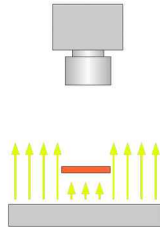
#### Ring-light

Shadow-free incident lighting for working distances of 30 mm to 300 mm. Increased contrast is achieved by segment-switched lighting.



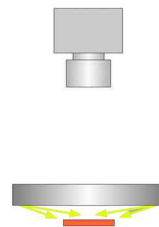
#### Side-lighting

General-purpose side-lighting. Freely adjustable, area-lighting or spotlight versions.



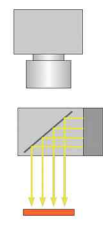
#### Back-lighting

Detection of edges and holes against a back-light. The test piece appears dark.



#### Dark-field

Illumination to enhance contrast across surfaces in relief. For small working distances of 0 mm to 20 mm.



#### Coaxial lighting

Reflection-free illumination for smooth and shiny surfaces.

You didn't find a suitable lighting system? Of course, we also make special custom lighting systems. Take advantage of our experience – we can provide competent advice and supply you with a free test sample on loan.

### Why you should choose our lighting systems:

- Highly durable
- Made in Germany
- 100% quality controlled
- Complies with CE, RoHs and WEEE
- Manufactured from high quality components