

# Stereomicroscopy

## KL 1500 LCD and KL 2500 LCD Cold Light Sources

Stereomicroscopy needs a lot of light in a narrow space. With normal light sources this would mean a lot of heat, which is very likely to ruin your specimens. Cold light sources ensure intensive specimen illumination with "cold", i.e. infrared-free light. This visible light is conducted right up to the specimen via high-quality fiber-optic light guides.



Specimen-preserving cold light is a standard feature of Carl Zeiss stereomicroscopes. The performance of the **KL1500 LCD** and **KL 2500 LCD** Cold Light Sources sets new standards for stereomicroscope illumination.

Salient features:

- **LC display of color temperature and operating modes**
- **Continuous electronic and mechanical dimming**
- **Stackability without compromise on function or operating convenience**
- **Easy lamp change – no tools required**

**Light Sources for  
Illumination and Contrasting**

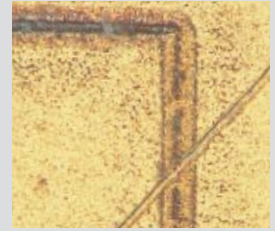


# Illuminating and Contrasting Methods

## Spotlight

Where the stereomicroscopist needs a lot of light concentrated in a small spot, fiber-optic spot illuminators are the answer.

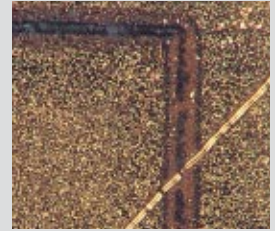
Fiber-optic light guides, whether slack or of the goose-neck type, have become standard as spot **epi-illuminators** in stereomicroscopy. Their flexibility allows them to be arranged at almost any position and angle relative to the specimen.



With the fiber illuminator set vertically inside the focusing bracket, you can use the **Transillumination Light Box** for brightfield transmitted-light observation, thanks to a two-mirror deflection system.



For **coaxial illumination** (only for Stemi SV microscopes), the illumination light is directly coupled into the stereomicroscope's observation beam path. Thus, the size of the light spot automatically adjusts to the specimen field covered. Disturbing reflections are eliminated by an anti-reflection cap.

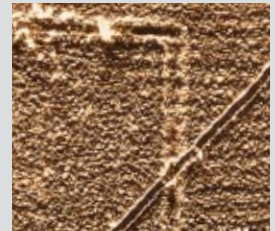


## Annular light

Annular illuminators provide circular illumination directed toward the center of the specimen, with almost no shadows. Annular slit illuminators allow darkfield observation with either epi- or transillumination.

For **darkfield epi-illumination**, the fibers of the annular illuminator are arranged to cast the light onto the specimen at an angle of  $60^\circ$  rather than vertically.

This way, only the light that is diffracted by the specimen can enter the objective.



For all-round **darkfield transmitted light**, a central stop between annular illuminator and specimen obstructs the direct light. Here again, **only** the light that is **diffracted** by the specimen and therefore carries information about it, can enter the objective. Switching from the central stop to an opal glass disk allows you to observe the specimen with brightfield transmitted light.

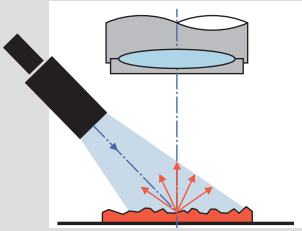


## Linear slit light

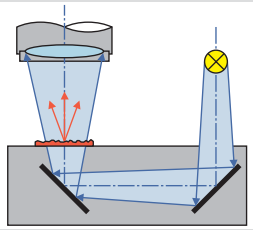
Epi-illumination of the specimen surface at a very small angle makes structures of extremely low height visible.

Here, the round cross-section of the fiber bundle is converted into a linear (slit) arrangement. The rays emerging from the linear slit form a carpet of light covering a large specimen area and casting shadows even of the smallest elevations.

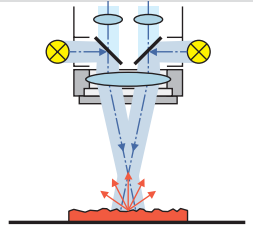




*Inclined epi-illumination casts shadows at the specimen structures, a prerequisite for three-dimensional images.*



*Simple configuration for brightfield transmitted-light illumination.*



*This brightfield illuminator brings out many details of flat, reflecting or polarizing surfaces.*

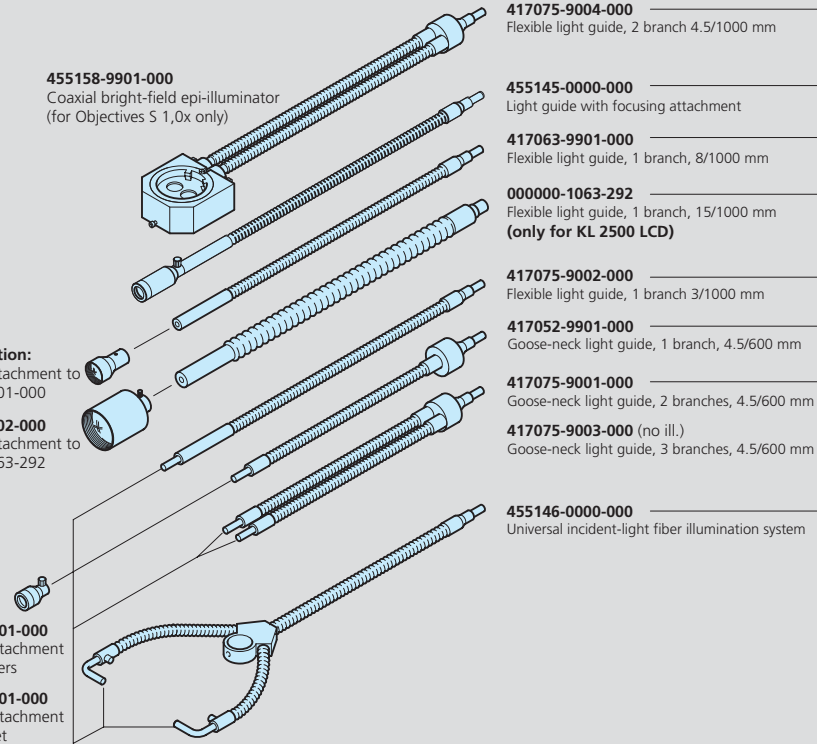
**455158-9901-000**  
Coaxial bright-field epi-illuminator  
(for Objectives S 1,0x only)

**in preparation:**  
Focusing attachment to  
417063-9901-000

**417090-9002-000**  
Focusing attachment to  
000000-1063-292

**417059-9901-000**  
Focusing attachment  
without filters

(no ill.) **417060-9901-000**  
Focusing attachment  
and filter set



**417075-9004-000**  
Flexible light guide, 2 branch 4.5/1000 mm

**455145-0000-000**  
Light guide with focusing attachment

**417063-9901-000**  
Flexible light guide, 1 branch, 8/1000 mm

**000000-1063-292**  
Flexible light guide, 1 branch, 15/1000 mm  
**(only for KL 2500 LCD)**

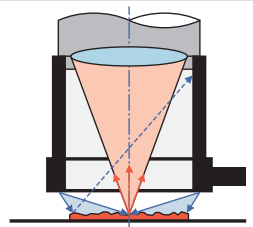
**417075-9002-000**  
Flexible light guide, 1 branch 3/1000 mm

**417052-9901-000**  
Goose-neck light guide, 1 branch, 4.5/600 mm

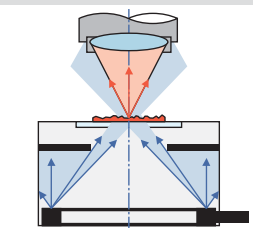
**417075-9001-000**  
Goose-neck light guide, 2 branches, 4.5/600 mm

**417075-9003-000** (no ill.)  
Goose-neck light guide, 3 branches, 4.5/600 mm

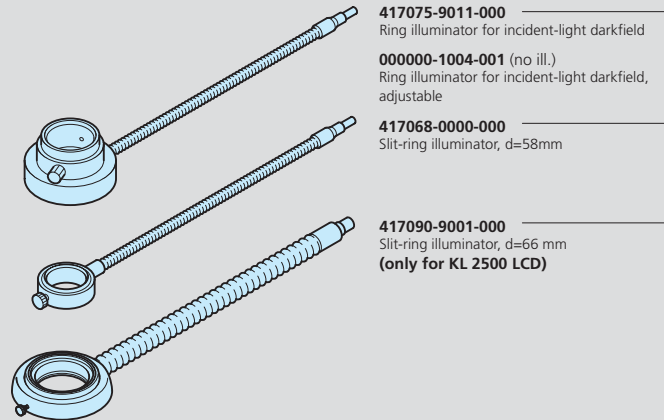
**455146-0000-000**  
Universal incident-light fiber illumination system



*For darkfield epi-illumination, the annular illuminator is positioned close to the specimen. It is used together with a sleeve that prevents extraneous light from impairing the contrast.*



*Especially with transmitted light, omnilateral darkfield reveals finest structures at high contrast.*

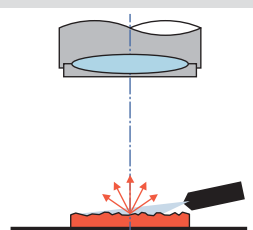


**417075-9011-000**  
Ring illuminator for incident-light darkfield

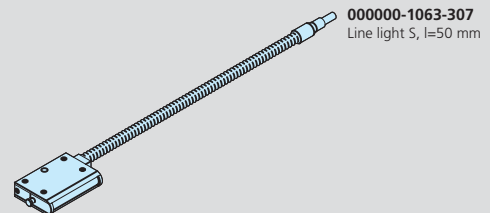
**000000-1004-001** (no ill.)  
Ring illuminator for incident-light darkfield,  
adjustable

**417068-0000-000**  
Slit-ring illuminator, d=58mm

**417090-9001-000**  
Slit-ring illuminator, d=66 mm  
**(only for KL 2500 LCD)**



*With incident illumination at an extremely flat angle, added contrast is produced by the high light yield and distinct shadows.*



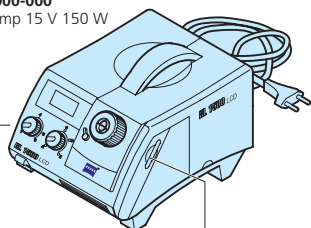
**000000-1063-307**  
Line light S, l=50 mm

A modular range of fiber-optic components permits the illumination to be adapted to the observation task.

**000000-1063-181**  
Cold-light source  
KL 1500 LCD (230V)

**000000-1063-182 (without illustration)**  
Cold-light source  
KL 1500 LCD (115 V)

**417053-0000-000**  
Halogen lamp 15 V 150 W



**000000-1063-301**  
Filter S, blue

**000000-1063-302**  
Filter S, red

**000000-1063-303**  
Filter S, green

**000000-1063-304**  
Filter S, yellow

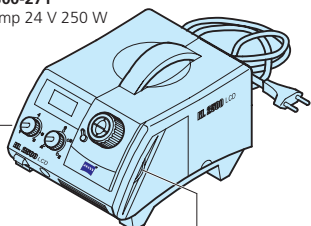
**000000-0163-306**  
Conversion filter S



**000000-1063-184 (no ill.)**  
Cold-light source  
KL 2500 LCD (115 V)

**000000-1063-183**  
Cold-light source  
KL 2500 LCD (230 V)

**000000-0300-271**  
Halogen lamp 24 V 250 W



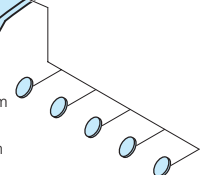
**000000-1063-313**  
Blue filter, d=28 mm

**000000-1063-314**  
Red filter, d=28 mm

**000000-1063-315**  
Green filter, d=28 mm

**000000-1063-316**  
Yellow filter, d=28 mm

**000000-1063-317**  
Conversion filter, d=28 mm



Illustrations on page 2:

- 1 Damaged gold coat, epi-illumination
- 2 Tragopogon blossom, brightfield transmitted light
- 3 Damaged gold coat, coaxial illumination
- 4 Damaged gold coat, darkfield epi-illumination
- 5 Tragopogon blossom, darkfield transmitted light
- 6 Fingerprint, "grayfield" epi-illumination



# Features of the Cold-Light Sources



Lamp compartment, permits fast change of the halogen lamp without tool

LC display of color temperature and operating mode

Switch for optimizing the illumination

Sturdy collet for light guides with active fiber diameters  
– up to 9 mm (KL1500 LCD)  
– up to 15 mm (KL2500 LCD)



Stabilized electronic brightness control

Mechanical brightness control without variation of the light's color temperature

Connection of remote control keypad or RS 232 interface (KL 2500 LCD only)

5-place filter wheel accommodating filters of 28 mm dia. (KL 2500 LCD only)



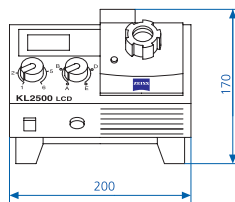
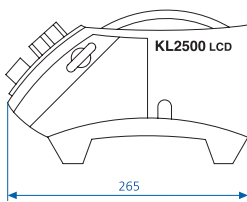
# Specification

	KL 1500 LCD	KL 2500 LCD
Weight	4.8 kg	6 kg
Cooling	Low-noise blower	
Stackability	yes	
RS232 interface	no	option
Filter holder	Filter insert S	5-place filter wheel for 28 mm filter dia.

Electrical data		
Operating voltage 115 V	100 V a.c., 50/60 Hz 120 V a.c., 60 Hz	
Operating voltage 230 V	220 V ... 240 V a.c., 50/60 Hz	
Enclosure	Protection class II	
Lamp type	Halogen reflector lamp	
Rated lamp voltage	15 V	24 V
Rated lamp power	150 W	250 W
Mean lamp life Step 4	1500 h	
Step 5	150 h	

Light data		
Luminous flux (Step 6)	600 lm	1300 lm
Brightness control	Electronic and mechanical	
Active fiber bundle dia.	max. 9 mm	max. 15 mm

Product certification	
115 V version	c CSA / UL
230 V version	VDE / EMC (complies with basic requirements of Annex I to Medical Products Directive 93/42/EEC)



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