CL 6000 LED/ CL 9000 LED

Operating Instructions

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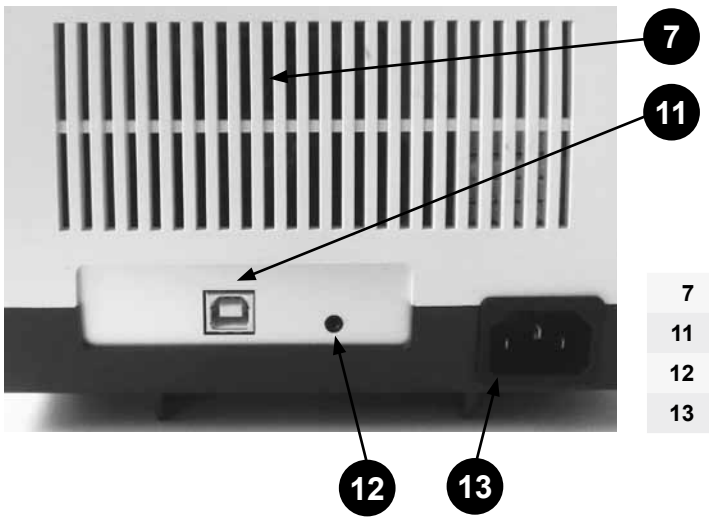
Device rear CL 6000 LED



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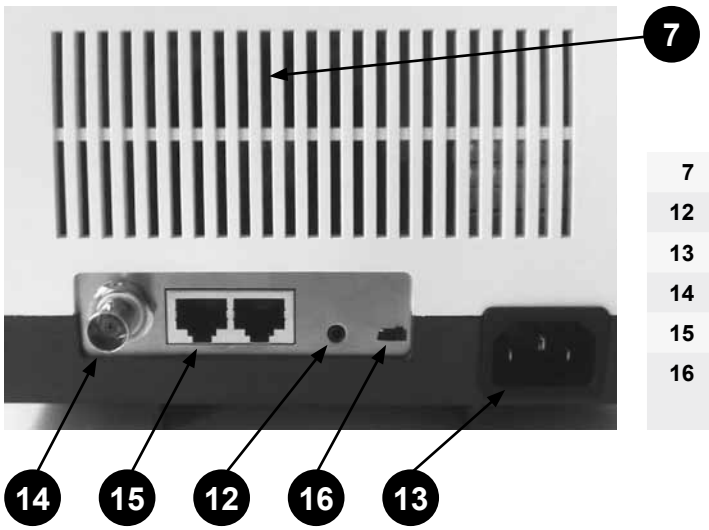
Device rear CL 9000 LED



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2 Important notes

Symbols:

Symbol	Description
	Warning of a hazard, observe documentation!

Intended use:

The cold light source CL 6000 LED/ CL 9000 LED is intended for indoor use in industry and laboratories. The cold light source must not be used in potentially explosive rooms or environments.

When used to the intended purpose, the cold light source serves to illuminate objects of all kinds by directing high-intensity visible light through various light guides to the object.

The cold light source CL 6000 LED/ CL 9000 LED meets the requirements of the following standards and directives:

DIN EN 61010-1 (IEC 61010-1)
DIN EN 62471
DIN EN 61326-1
Directive 2004/108/EC
Directive 2006/95/EC

Compliance of the device with requirements in the above-mentioned standards and directives is evidenced by means of the pertinent technical documentation.

 Safety notes:

The cold light source emits visible high-intensity light. Metering of photo-biological safety according to DIN EN 62471 resulted in the classification of the device into Risk Group 2.
Please study and observe these Operating Instructions carefully, as they contain important information relating to the safety of the user and the device. Safety of the device and the user is not ensured if the Operating Instructions are not adhered to.

 **CAUTION! Potentially hazardous optical radiation. Avoid looking into the lamp or the light guide aperture emission for longer periods during operation. May be harmful to the eyes.**

Light-absorbing materials convert impinging light into heat. Hence, heat-sensitive and/or inflammable light-absorbing materials may suffer thermal damage and/or burns. Please observe the below notes in order to avoid such damage and hazards:

- Do not cover open light guide holders or light guide outlets at any time! Risk of fire!
- Avoid at all cost covering open light guide holders or light guide outlets by hands or other parts of the body. Risk of burns!
- When illuminating heat-sensitive or inflammable light-absorbing objects (e.g. in microscopy), make sure there is a distance between the relevant material and the employed light guides, and adjust the intensity of the light source so as to prevent damage to the object.
- All light guide outlets that are not in use during operation must be kept at a safe distance – i.e. at least 10 cm – from heat-sensitive or inflammable light-absorbing materials while the light source is switched on.
- Biological tissue may be exposed to unnecessarily high stress and may be subject to damage during excessive illumination with visible light, hence the intensity of the light source and the duration of illumination of such tissues should be limited to the absolutely necessary levels and periods.

The cold light source may only be operated at the voltage indicated on the nameplate (9).

Ensure a safe protective conductor connection.

The cold light source was developed for indoor use in dry rooms.

The cold light source must not be used in potentially explosive environments.

Safe disconnection from power supply can only be ensured by pulling the mains plug.

All ventilation openings (7, 8) must be uncovered at all times to ensure sufficient cooling of the device. In case of insufficient cooling an integrated sensor will continuously control light intensity down until shutdown to protect the illuminant from overheating and damage. In this case, the LCD (3) will issue an error message (see Chapter 3.5. for LCD messages).)

The device may only be opened or disassembled by authorised service personnel. Technical changes on the device are prohibited. Repair may only be effected by manufacturer or authorised service personnel.

These Operating Instructions must be swiftly available and accessible to any device operator.

Manufacturer does not assume liability for any damage that results from failure to observe these Operating Instructions.

3 Start up

3.1 Light guide holder

Rotate the collet chuck of the light guide holders (4) in counter-clockwise direction to open the collet chuck. Push the light guide into the light guide holder to its limit-stop and rotate the collet chuck (4) in clockwise direction to close it and to ensure that the light guide is firmly positioned. Light guides with guide pin: Make sure to insert the guide pin into one of the guiding slots. Please use only original fibers which are approved for the light sources CL 6000 LED and CL 9000 LED by Carl Zeiss

CAUTION! The light guide holder (4) is equipped with a safety shutdown to protect the user from dazzling. If the light guide is inserted into the light guide holder incorrectly or not all the way to the limit-stop, the light of the light source will not start when switched on, and the message „Light Guide!“ is shown in the display.

3.2 Mains connection

Push the barrel connector of the power cable (supplied with the device) into the respective connection socket (13) at the device rear. Use the cold light source only with the power cable that was supplied with the device. Connect the plug connector of the cold device cable to the power supply.
Other country-specific variants of the power cable are available from Carl Zeiss. Furthermore every commercially available power cable which meets with standards and specifications can be used.

3.3 Start-up of the device

Switch on the cold light source by actuating the main switch (1). The LCD display (3) of the cold light source is active in switched-on condition. When used the first time, the cold light source starts with an intensity of 0%. Upon each new switch-on, the light source starts with the intensity setting of the prior use.

3.4 Switching off the device

Switch off the cold light source by actuating the main switch (1) (all-pole power disconnection). The device will not consume any power in the switched-off mode.

CAUTION! Pull the mains plug for safe disconnection of the device from the power supply!

4 Operation of the light source

4.1 Brightness settings and adjustment

Rotate the encoder (2) in order to adjust the intensity (up: clockwise direction; down: counter-clockwise direction).
By repeatedly briefly pressing the rotary encoder (2) the intensity can be adjusted in pre-set stages of 0, 20, 40, 60, 80 and 100 (factory pre-settings).
A menu can be accessed by pressing the incremental encoder (2) for at least 3 seconds. The menu navigation is shown in the LCD display (3). In the menu, individual intensities in 6 memory locations can be set and stored.
In addition, fine setting of the rotary encoder can be determined by the user, to be chosen from the following settings: coarse (25 steps), medium (50 steps) and fine (100 steps).
The factory settings of the device can be re-instated.
The menu functionality is explained in detail in Chapter 4.3 „Setup menu and LCD display“.

Display indication directly after switch-on.
The display changes after a few seconds.
(Also applicable to CL 9000 LED)

Intensity set to Zero.
Rotate the incremental encoder (2) to change the intensity e.g. to 33. (Also applicable to CL 9000 LED

Intensity has been set to 33t.
Rotate the incremental encoder (2) to change the inten

4.2 Memory storage stages

By repeatedly briefly pressing the rotary encoder (2), successively stored brightness levels which were saved in the device‘s 6 memory slots can be accessed. The factory settings are 0/ 20/ 40/ 60/ 80 and 100. The memory slots can be programmed individually in the setup menu. Each of the 6 memory slots can be assigned brightness values from 0 to 100 or can be completely switched off so that the respective storage slot will not be accessed when the rotary encoder (2) is pressed.

Example:
To quickly switch between the maximum brightness level 100, dimmed brightness level at stage 25 and „light off/no brightness“, the 6 memory slots can be programmed as follows:

Mem 1 -> 100
Mem 2 -> 25
Mem 3 -> 0
Mem 4 -> OFF
Mem 5 -> OFF
Mem 6 -> OFF

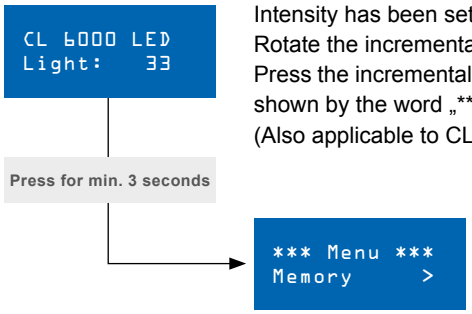
By repeatedly briefly pressing the rotary encoder (2), the following sequence is activated:

100 -> 25 -> 0 ->100 -> 25 -> 0 ->100 -> 25 -> 0 ->100 -> 25 -> 0 ->…

The functionality of the menu is described in detail in Chapter 4.3 „Setup menu and LCD display“.

4.3 Menu navigation and LCD display

4.3.1 Set up menu

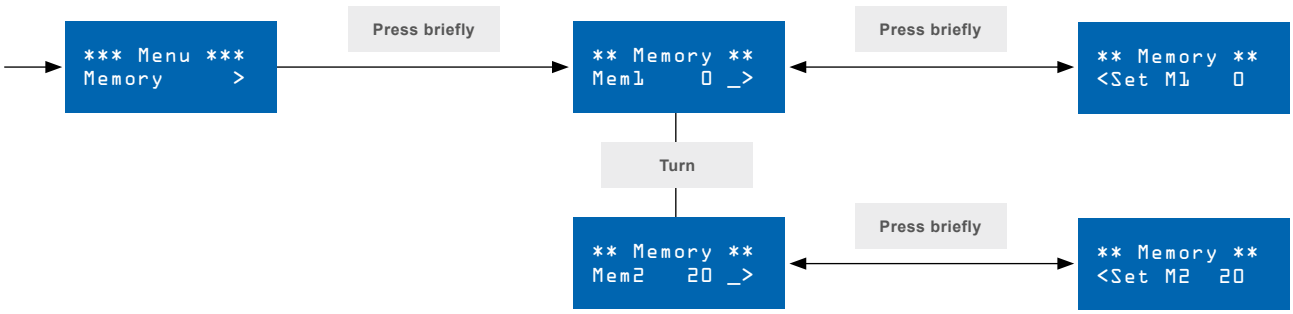


4.3.2 Menu item „Memory“

In this menu item you can display and program the 6 memory slots individually. Also each memory stage can be switched off so that it will not be called by pressing the rotary encoder (2).

The sub-menu „Memory“ is called by briefly pressing the encoder (2). The top line of the display shows „**Memory**“, and the bottom line of the display shows the respective memory slot Mem 1 - 6 with the corresponding intensity value.
By turning the rotary encoder (2), the intensity values of the memory slots Mem1 to Mem6 will be shown.

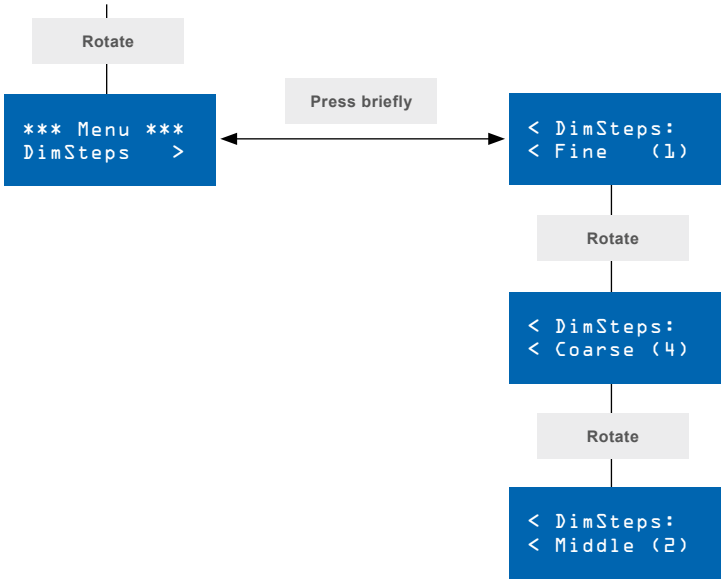
When the memory slots Mem1 to Mem6 are displayed, the „set M“ display for the respective memory slot can be called up and accessed by briefly pressing the rotary encoder (2). By turning the rotary encoder (2) the desired brightness value can be set (level 0 ... 100) or by selecting „OFF“ it can be switched off. By briefly pressing the rotary encoder (2), the selection is stored, and you leave the submenu„



By turning the rotary encoder (2) in the submenu “Memory” you will access the subitem “Exit menu”. By pressing the rotary encoder (2) again briefly you will leave the submenu “Memory”.

4.3.3 Menu item „DimSteps“

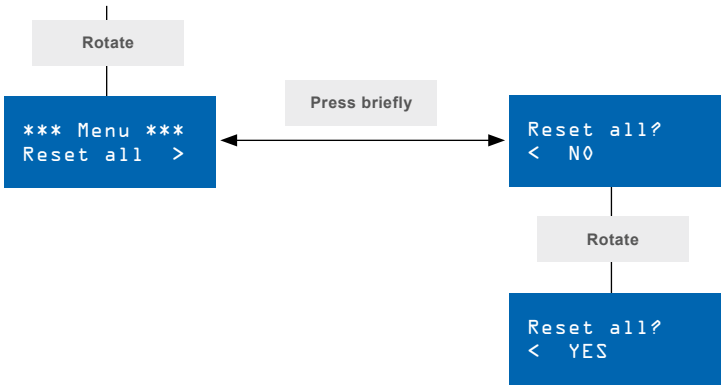
In this sub-menu the fineness of the rotary encoder (2) can be set and adjusted.



Rotate the incremental encoder (2) in the menu to access the menu item „DimSteps“. Briefly press the incremental encoder (2) to access a sub-menu where the fineness of intensity steps can be adjusted. Rotate the encoder (2) to select between the settings ‘coarse‘, ‘medium‘ and ‚fine’.
The setting ‘fine’ controls the intensity in 100 steps of 1 unit each. In the setting ‘coarse’, the intensity is controlled in 25 steps of 4 units each, and in the setting ‘medium’, the intensity is controlled in 50 steps of 2 units each.
Confirm the selection by briefly pressing the encoder again.

4.3.4 Menu item „Reset all“

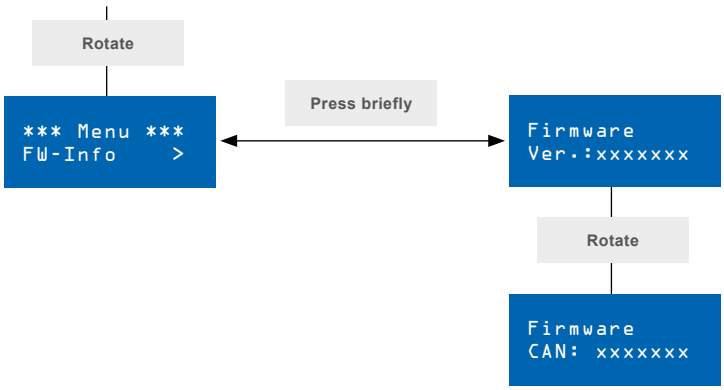
In this sub-menu all adjustable parameters can be reset to the factory settings



Rotate the incremental encoder (2) in the menu to access the menu item ‘Reset all’. Briefly press the rotary encoder (2) to access a sub-menu where the factory settings of the device can be re-instated. The display shows the question ‘Reset all?’. Rotate the incremental encoder to decide between ‘NO’ and ‘YES’ and briefly press the incremental encoder (2) to confirm your selection.
Choosing option ‘NO’ will retain the device settings, while option ‘YES’ will reset the device to its factory settings.

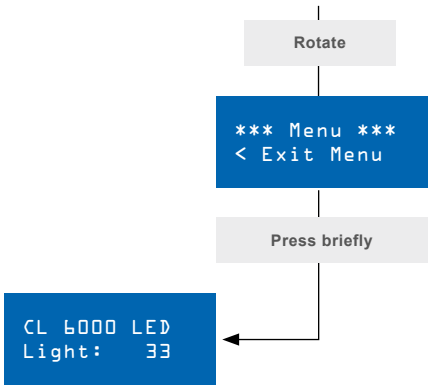
4.3.5 Menu item „FW-Info“

In this sub-menu the current firmware status and the set CAN address can be called up (important for servicing purposes).



Rotate the incremental encoder (2) in the menu to access the menu item „FW Info“ for firmware information. Briefly press the incremental encoder (2), and the information items will be shown in the display shortly one after another. Subsequently, the display will automatically revert to the menu item ‘FW Info’.
This menu item is provided for information only and cannot be used to set device parameters.

4.3.6 Exit menu



Rotate the incremental encoder (2) in the menu to access the menu item „Exit Menu“. Briefly press the incremental encoder (2) to exit the menu and revert to regular operation mode.
The display again shows the designation „CL 6000 LED“ and the intensity which was set last (e.g. 33).
(Also applicable to CL 9000 LED)

The setup menu can also be left by pressing the rotary encoder (2) by more than 3 seconds.

4.3.7 Other messages shown in the display

With the footswitch (accessory) connected the light source can be switch on and off quickly and easily. After switch-off of the light source by the footswitch, „Standby“ will be shown in the display. (Also applicable to CL 9000 LED)

If no light guide was inserted into the light guide holder (4) or if the light guide was not inserted up to the limit-stop or if a light guide of another manufacturer is used which is not suitable for the CL 6000 LED/ CL 9000 LED the light of the light source will possibly not light up upon switch-on, and the display (3) will show the message „Light Guide!“.
Loosen the collet chuck by rotating it in counter-clockwise direction and insert a light guide into the light guide holder (4) pushing it all the way to the limit-stop. Please note that only light guides should be used which have been approved by Carl Zeiss for use with CL 6000 LED and CL 9000 LED. A list of these light guides can be found in the Zeiss brochures, system diagrammes and price lists.
(Also applicable to CL 9000 LED)

4.3.8 Error messages

The following error messages will help the service staff to identify a malfunction of the light guide and to rectify the problem quickly. If one of the below error messages is shown in the display of the light guide, shutt off the device and contact customer service. All error messages also apply to CL 9000 LED.

The integrated temperature sensor is not working properly, i.e. there is no protection against potential overheating of the device.

The LED is defect or is disconnected from power supply.

The illuminant has heated up too much. The illuminant was switched off automatically. Make sure the ventilating openings are not covered.

he control PCB has heated up too much. The illuminant was switched off automatically. Make sure the ventilating openings are not covered.

The fan has become blocked or is malfunctioning. Sufficient cooling is not ensured.

4.4 Filter slider

The filter slider (5) is fitted with 3 positions, the first two of which can be pulled out and equipped with the appropriate colour and conversion filters designed for this purpose. The third position is an empty position that cannot be equipped with a filter. The filter slider (5) slightly locks into place when the respective position has been reached.

CAUTION! Only use original filters for CL 6000 LED/ CL 9000 LED and ensure that the filter sliders lock into the desired position in order to avoid damage. The light source emits high-intensity light. Use of unsuitable filters may cause thermal damage of the filters or the device. Thermal damage may be caused on the filter slider if the filter is not locked into one of the three positions.

Original filters can be bought from Carl Zeiss or Zeiss-authorised specialised dealers.

4.5 Interfaces

4.5.1 Footswitch interface

The CL 6000 LED and CL 9000 LED are fitted with an interface to connect a footswitch (12). The interfaces are located at the device rear and are marked „Footswitch“.
A footswitch can be connected to the footswitch interface in order to switch the light of the light source on and off. A suitable footswitch is available from Carl Zeiss and authorised Zeiss dealers.

4.5.2 USB interface

The CL 6000 LED is fitted with a USB interface (11), which is located at the device rear and is marked „USB“.
By means of the USB interface the light source can be connected to a PC which also has a USB interface. The user will need to produce a respective programme in order to access and activate the light source from the PC.
For further information please contact Carl Zeiss.

4.5.3 CAN interfaces

The CL 9000 LED is fitted with two CAN interfaces (15) located at the device rear and marked „CAN“.
The light source can be connected to the Zeiss CAN System via the CAN interface and accessed and activated via SyCoP system control panel respectively imaging and documentation software by Carl Zeiss. Please observe the respective SteREO Discovery operating instructions.
A sliding switch with 3 positions is also provided at the device rear. This sliding switch serves the clear identification of a light source when several light sources are connected to the overall system. Up to 3 CL 9000 LED light sources can be integrated into the Zeiss CAN System. In that case the sliding switch is to be set to „1“ for the first, to „2“ for the second and to „3“ for the third light source.
For further information please contact Carl Zeiss.

4.5.4 BNC Trigger interface

The CL LED 9000 is fitted with a BNC Trigger interface (14). The interface is located at the device rear and marked „Trigger“. This interface allows the LED to be switched on and off quickly by means of an electrical signal (up to 5 V). For triggering e.g. Zeiss Axiocam camera can be used. In addition, the BNC interface is compatible to the exposure function of the Zeiss Cell Observers. For further information please contact Carl Zeiss.

4.6 Accessories

A comprehensive accessories programme for CL 6000 LED/ CL 9000 LED is available from Carl Zeiss and authorised Zeiss dealers. For more detailed information please have a look at our brochures about Zeiss stereo microscopy, e.g. stereo Discovery. Flawless functional operation, safety and a high light yield of the light source are only ensured with original light guides recommended by Carl Zeiss for the CL 6000 LED/ CL 9000 LED.

CAUTION! Use of other light guides may trigger the safety shutdown which inhibits the switching-on of the illuminant of the cold light source. In such case the message „Light Guide!“ is shown in the display.

The original light guides are available from Carl Zeiss or authorised Zeiss dealers..

5 Maintenance

The CL 6000 LED/ CL 9000 LED is basically a maintenance-free device.

The cold light source is not designed for desinfection (e.g. in medical applications). Please clean the cold light source only externally with a soft dry cloth.
Slightly moisten the cloth with a commercial plastic cleaning agent to remove tenacious soiling.

CAUTION! Do not spray any fluids into the ventilation openings (7, 8). Do not use a wet cloth to clean the cold light source.

6 Troubleshooting

Type of malfunction	Possible cause	Remedial action
No light	No light guide adapted. Unsuitable light guide adapted. Light guide not adapted into light guide holder deep enough to the limit-stop (Display shows “Light guide!”)	Insert a suitable light guide into the light guide holder
	Device not switched on	Switch on the device
	Plug not in socket	Put the plug into the socket
	No voltage	Check voltage
Luminous intensity deteriorates	Electronic parts are overheated	Ensure sufficient cooling, re-start the device after a longer cooling-down period
Illuminant fails to light up and „OVER-TEMP“ is shown in the display	LED or electronic parts are overheated	Ensure that ventilation openings are not covered, start the device after a longer cooling-down period

In case of any malfunctions of your cold light source that cannot be rectified by means of the above measures, please contact your specialised dealer or Carl Zeiss.

CAUTION! Do not open the device yourself. Repairs may only be carried out by authorised and skilled personnel.

7 Technical data CL 6000 LED

Features	Values
General information	
Type designation	CL 6000 LED
Dimensions (W x H x D) [mm]	192 x 118x 240
Weight [kg]	3,1
Cooling	Axial-flow fan
Temperature: in normal operating mode	5 - 40º C
Temperature during transport/storage	-40 - 70º C
Air humidity, pressure in normal operating mode	10 - 92%, no condensation
Air humidity, pressure during operation	30 - 75%
Atmospheric pressure in normal operating mode	760 – 1060 hPa
Atmospheric pressure during transport/storage	700 – 1060 hPa
Use to intended purpose	indoor use
Electrical data	
Operating voltage, frequency	100-240V ± 10%, 50 – 60 Hz
Overvoltage category	II
Power consumption max.	70 W
Protection class	IP 20
Degree of soiling	2
Lighting data	**Typical values**
Maximum usable active diameter of light guide [mm]	9
Total luminous flux at light guide exit [lm] with max. intensity (step 100)*	600
LED life (up to decrease to 70% brightness [h]	minimum 50,000
Correlated colour temperature [K] at the light guide exit*	6200
Correlated colour temperature [K] at the light guide exit* with conversion filter „daylight“	5600
Correlated colour temperature [K] at the light guide exit** with conversion filter „halogen light“	3200
Test mark	CE, cULus
EMC emission class	B

** ZETT OPTICS Light guide, flexible, active Ø 9 mm, length 1000 mm, step 100. Every light source will be calibrated on 620 lm ± 20 lm.*

7 Technische Daten CL 9000 LED

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Air humidity, pressure in normal operating mode	10 - 92%, no condensation
Air humidity, pressure during operation	30 - 75%
Atmospheric pressure in normal operating mode	760 – 1060 hPa
Atmospheric pressure during transport/storage	700 – 1060 hPa
Use to intended purpose	indoor use
Electrical data	
Operating voltage, frequency	100-240V ± 10%, 50 – 60 Hz
Overvoltage category	II
Power consumption max.	80 W
Protection class	IP 20
Degree of soiling	2
Lighting data	**Typical values**
Maximum usable active diameter of light guide [mm]	9
Total luminous flux at light guide exit [lm] with max. intensity (step 100)*	900
LED life (up to decrease to 70% brightness [h]	minimum 50,000
Correlated colour temperature [K] at the light guide exit*	6200
Correlated colour temperature [K] at the light guide exit* with conversion filter „daylight“	5600
Correlated colour temperature [K] at the light guide exit** with conversion filter „halogen light“	3200
Test mark	CE, cULus
EMC emission class	B

** ZETT OPTICS Light guide, flexible, active Ø 9 mm, length 1000 mm, step 100. ZETT OPTICS Light guide, flexible, active Ø 9 mm, length 1000 mm, step 100. Every light source will be calibrated on 890 lm ± 20 lm.*

8 Exposure hazard values (EHV) (as by DIN EN 62471)

CL 6000 LED

	With light guide	Without light guide
Photochemical hazard: Free group	41,3	60,7
Photochemical hazard: Risk Group 1	5,9	4,3
Photochemical hazard: Risk Group 2	0,01	0,01
Thermal hazard: Free group/ Risk group 1	2,5	1,8
Thermal hazard: Risk Group 2	0,8	0,6

CL 9000 LED

	With light guide	Without light guide
Photochemical hazard: Free group	52,5	88,6
Photochemical hazard: Risk Group 1	8,8	5,9
Photochemical hazard: Risk Group 2	0,02	0,01
Thermal hazard: Free group/ Risk group 1	3,7	2,5
Thermal hazard: Risk Group 2	0,94	0,95

9 Hazard distances (HD) (as by DIN EN 62471)

CL 6000 LED

	With light guide	Without light guide
Photochemical hazard: Free group	1,3m	1,6m
Photochemical hazard Risk Group 1	0,5m	0,4m
Thermal hazard: Free group/ Risk Group 1	0,3m	0,3m

CL 9000 LED

	With light guide	Without light guide
Photochemical hazard: Free group	1,5m	1,9m
Photochemical hazard Risk Group 1	0,6m	0,5m
Thermal hazard: Free group/ Risk Group 1	0,4m	0,3m

10 Gehäuseabmaße