

## Operating instructions for the LM macroscope lens



### Mounting the camera



#### Connecting the camera and the macroscope lens:

Make sure that the tip of the bayonet thread is exactly on the tip of the camera thread before turning clockwise until it locks into place. If necessary, hold down the button for releasing the camera thread.



#### Positioning the camera:

If needed, the camera can be turned to another position with the three small screws of the bayonet ring.



#### Option A: Mounting the camera to stands of other (non-LMscope) manufacturers:

The back of the LM macroscope lens has a tripod socket with a small **photo thread (thread size: UNC 1/4 inch)**, which can be used to mount the camera to a variety of stands.



### Option B: Mounting the camera to the LMscope stand:

The macroscope lens module is mounted to the LMscope stand using a **solid lens mount**.

## Camera settings

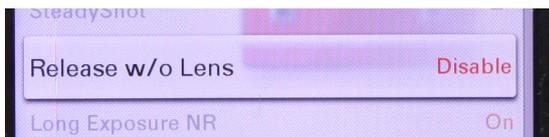


### Disabling the power saving features:

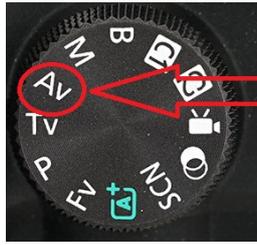
When used in a **stationary setting (lab or studio)**, the camera is usually connected to an external power source. In that case, we recommend **disabling the camera's power saving features** in the menu for more convenient use of the camera.

Autopower OFF ==> Disable

Display OFF ==> Disable



Some cameras by default require a lens to be attached in order to release the shutter. If this is the case with your camera, select the **“release without lens”** option in the camera menu (wording varies from manufacturer to manufacturer).



## Exposure settings:

We recommend working in AV/A mode with **automated aperture priority**. The camera then **automatically selects the shutter speed** needed to make a correct exposure.



In conditions with homogeneous illumination and high light intensity, the **best results are obtained at low ISO sensor settings (50 to 200)**.

Low ISO speeds optimise the camera's **dynamic range**.

When capturing moving live objects, where **illumination** is only possible to a **certain extent**, the best way to get optimal results is using the **camera's Auto ISO mode**. The camera then automatically adjusts the ISO to ensure the image is neither under- or overexposed. Using an **additional flash** with motion shots is also a good way to counter low light conditions and get a sharp focus on moving subjects. Another effective method in motion shots is to use a flash in combination with continuous lighting.

## Illumination

In photography, lighting is an essential factor that can make or break an image. High image quality can only be achieved if the **lighting is optimal**. Depending on the requirements in each case, different illumination options are available.

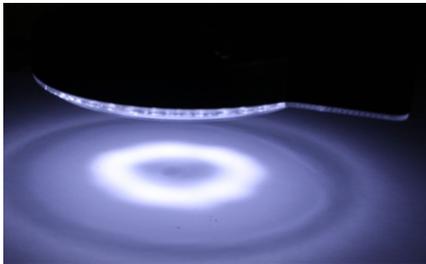
For stationary objects, we recommend bright LED illumination. Depending on the application required, an **LED ring light**, **several LED spotlights**, a transmitted light box or a combination of these light sources can be used.



## LED ring light:

Provides good basic illumination for **homogeneous light** in the area captured by the camera.

Disadvantage: The illumination angle is fixed, and complex aspects are often not captured in full clarity and detail.

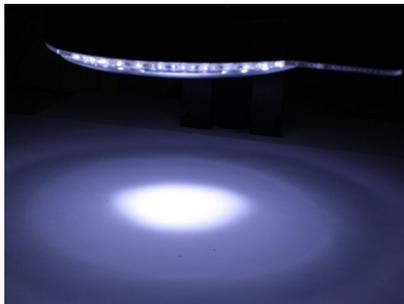


The goal is to achieve uniform, homogeneous lighting.

## LED working distance:

A working distance that is too short or too long causes darkening at the centre of the image.

By loosening the three knurled screws, the LED ring light can be moved, allowing the distance to the specimen to be increased or decreased.



By adjusting the ring light to the optimal working distance, you get an evenly illuminated visual field in the area captured by the camera.



## LED spotlights:

One or more LED spotlights with an inbuilt diffuser provide even and homogeneous illumination. The flexible gooseneck allows 360 degree lighting angle adjustment. The direction of the light source can be used to enhance different details of the subject shown in the image.



## Transmitted light illumination:

LED light boxes, such as the Kaiser LED light box, are a useful, inexpensive source of transmitted light.

## First steps with the LM macroscope lens

(1) **Position a test specimen** on the base plate and **turn on the light source and camera**.

(2) Adjust the illumination.

(3) **Focus the image on the camera screen or on an external monitor**. The specimen can be brought into focus by raising or lowering the camera-lens unit or by moving the specimen stage up or down.



(4) Make precise adjustments on the camera display using the **magnifying function** (2x / 5x / 10x) or remotely on the computer monitor using the camera control software. It also has a magnifying tool for fine-tuning the focus in the live image.



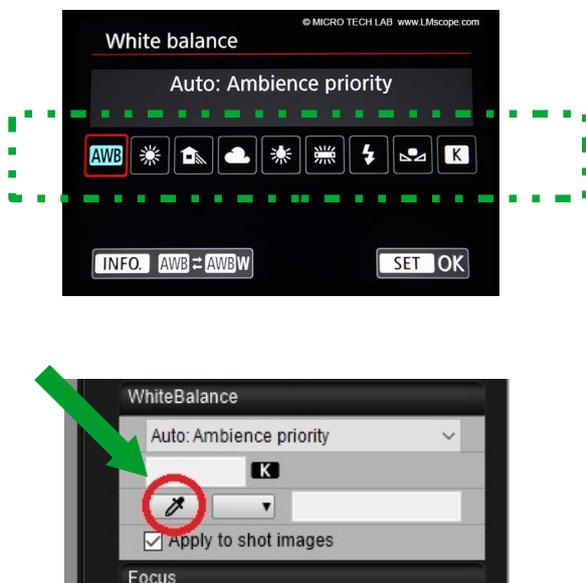
(5) Shutter release: To avoid motion blur, we recommend using a remote control release or a delay timer.

## Remote control from a computer



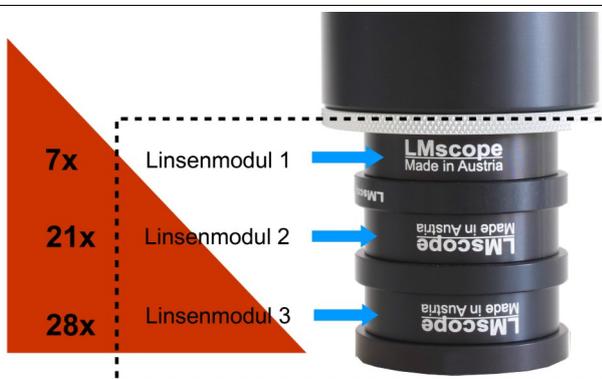
### Tethering software: Use Live View to control the camera from a PC or Mac

The most elegant solution is to control the camera remotely from the computer. Once the subject is in focus, the user only needs to tap the shutter button to take a photo. The images are usually transferred directly to the hard drive and stored there. Most camera models also support shooting without an SD card installed.



For high image quality and natural-looking colours, the camera should be **white balanced**. This can be done in the camera menu by changing the Kelvin temperature of the light source, or, for more precise adjustments, with the camera control software on the computer. With the Canon EOS Utilities software, for example, the white balance can be adjusted with the **eyedropper tool**. Just use a white object as a reference, and with one click, the white balancing is done.

## Setting different magnifications



The LM macroscope lens 28x is equipped with a three-part lens system. The highest magnification is achieved when all three modules are attached.



Individual modules can be removed by turning them counterclockwise. If not in use, we recommend storing lens modules in a **dust-proof plastic bag** or in a **separate plastic box**. During storage, any exposure to dust or other debris must be avoided at all times.

Based on our internal tests, using two attached modules has proven to be the most versatile option, as it provides the best balance between working distance and large field of view.

## Adding optical filters

The LM macroscope lens also comes with a filter holder which accommodates a selection of optical filters.



(1) Unscrew the bayonet adapter counterclockwise to get access to the **filter holder**. It has an **M37 thread**.



(2) Then, screw the optical filter onto the filter holder.



(3) Last, screw the bayonet adapter back onto the macroscope lens.