

User manual

Microscope camera with LCD-display

KERN ODC-23

ODC 231

Version 1.0
01/2025
GB





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1 Declaration of conformity

The current EC/EU Declaration of Conformity can be found online at:
<https://www.kern-sohn.com/shop/de/DOWNLOADS/>



2 Basic information


2.1 General information on warnings

Warnings are used in these user manuals to warn you of possible personal injury or damage to property in certain situations.

Signal word	Description
DANGER	Failure to observe the instructions will lead directly to serious injury, permanent impairment (e.g. loss of a limb) or death of the user or third parties.
WARNING	Failure to observe the instructions may result in serious injury, permanent impairment (e.g. loss of a limb) or death of the user or third parties.
CAUTION	Failure to observe the instructions may result in minor injuries or temporary damage to the user or third parties (e.g. minor cuts).
NOTE	Failure to observe the instructions may result in damage to property.

Symbols in warning notices:

Symbol	Meaning
Warning signs	Warning signs warn you of dangers that may lead to personal injury. The symbol indicates the type of hazard.
	Indicates general hazards or a danger point
	Warning of electrical voltage

Symbol	Meaning
Command sign	Mandatory signs prescribe measures that you must take to avoid personal injury or damage to property. The symbol indicates the necessary actions or objects to prevent damage.
	Indicates a prescribed action

2.2 Intended use

The LCD-display camera for the OBT microscope series enables a more convenient and effective way of microscopy by projecting the view of the sample onto a larger screen and providing the ability to record and save.

2.3 Improper use

The LCD-display camera is not to be used for medical purposes. Do not use the device in potentially explosive atmospheres or for measurements in liquids or on live parts. Unauthorised structural changes, additions or conversions to the device are prohibited.

2.4 Warranty

The warranty is void in the event of

- Failure to comply with our specifications in the user manual
- Use outside the described applications
- Modification or opening of the device
- Mechanical damage and damage caused by media, liquids, natural wear and tear
- Improper set-up or electrical installation
- Improper assembly or electrical installation

3 Basic warnings and safety instructions

3.1 Observe the notes in the operating instructions




Read the operating instructions carefully before commissioning/using the device, even if you already have experience with KERN devices. Always keep the instructions in the immediate vicinity of the appliance.

3.2 Staff training

The appliance may only be used by persons who have read and understood the operating instructions, particularly the chapter on safety.

3.3 Safety

⚠ WARNING	
	<p>Read all safety information and instructions. Failure to observe the safety information and instructions may result in electric shock, fire and/or serious injury.</p> <p>Keep all safety information and instructions for future reference.</p> <ul style="list-style-type: none">• The packaging must be opened carefully to prevent the accessories inside from falling to the floor and breaking.• Avoid dirt or fingerprints around the camera's sensor, as in most cases this reduces image clarity.• The sensors and electronics inside the camera are very sensitive to light. Therefore, never hold the camera in direct sunlight for long periods of time.• Do not expose the appliance to strong vibrations.• Do not use the appliance in a damp environment, replace it under water or allow liquids to penetrate the inside of the appliance.• Do not operate the appliance in potentially explosive rooms or areas and do not install it there.• Do not open the appliance and do not remove any safety signs, stickers or labels from the appliance. Keep all safety signs, stickers and labels in a legible condition.

4 Transport and storage

Note

If you store or transport the device improperly, the device may be damaged. Observe the information on transporting and storing the appliance.

Transport

When transporting the appliance, use the original transport case to protect the appliance from external influences.

Storage

Observe the following storage conditions when the device is not in use:

- Dry and protected from frost and heat
- The ideal temperature range is between 0 and 40 °C and a relative humidity of 85 % should not be exceeded
- Protected from dust ingress
- The storage temperature corresponds to the technical data

Packaging/return transport

Returns are only possible within the limits of the general terms and conditions. Keep all parts of the original packaging for any necessary return transport

- Only use the original packaging for return transport
- Disconnect all connected cables and loose/movable parts before shipping
- Reattach any transport locks provided
- Secure all parts against slipping and damage

5 Unboxing and scope of delivery

5.1 Unboxing



In the event of a return, please observe the instructions in the chapter "Packaging/return transport".

On receipt of the appliance, you should first check that no damage has occurred during transport, that the outer packaging, the housing, other parts or even the appliance itself have not been damaged. If any damage is evident, please notify KERN & SOHN GmbH immediately.

5.2 Scope of delivery

- 7-inch display camera for microscopes
- Double USB 5 V / 2 A power adapter
- USB cable for power supply (2x)
- USB cable for PC connection
- MicroSD card 16 GB
- Calibration slide with multi micrometer
- User manual



Note:

Before installing the display, make sure, that all listed items are included in the package.

6 Technical data / Features

Model	ODC 231
Type of sensor	Color CMOS Image Sensor
Sensor size	1/2.8 Inch
Pixel size	2.9 μm (H) \times 2.9 μm (V)
Sensor resolution ratio	1920 X 1080
Exposure control	Auto / Manual
Power Frequency	DC / 50 Hz / 60 Hz
White balance control	Auto WB / Once WB / Manual
Cross-line	4 Sets
Calibration and measurement	Support Calibrating and line measuring
Snap	Button snap / timed snap
Video recording	Supported
Frame rate	30 FPS @ 1920 * 1080
Image adjusting Parameters	Saturation/ Hue / Brightness / Contrast / Monochrome / Flip vertical / Flip horizontal / FOV
FOV	20 % - 100 % of Eyepiece FOV
Storage for snap and record	MicroSD card (FAT32)
Language	German / English / French / Russian / Chinese
Firmware Software Update	Supported by KERN-Service
Connecting way	Microscope head socket
Overall dimensions	182 mm * 125 mm * 85 mm

7 Assembly to microscope KERN OBT-series

1 Loosen screw and remove microscope head



2 Insert display head

3 Fasten screw

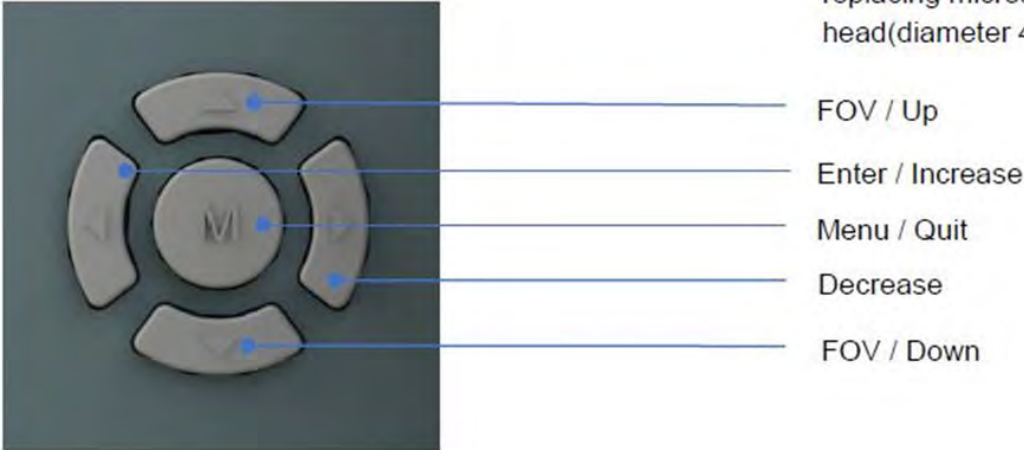
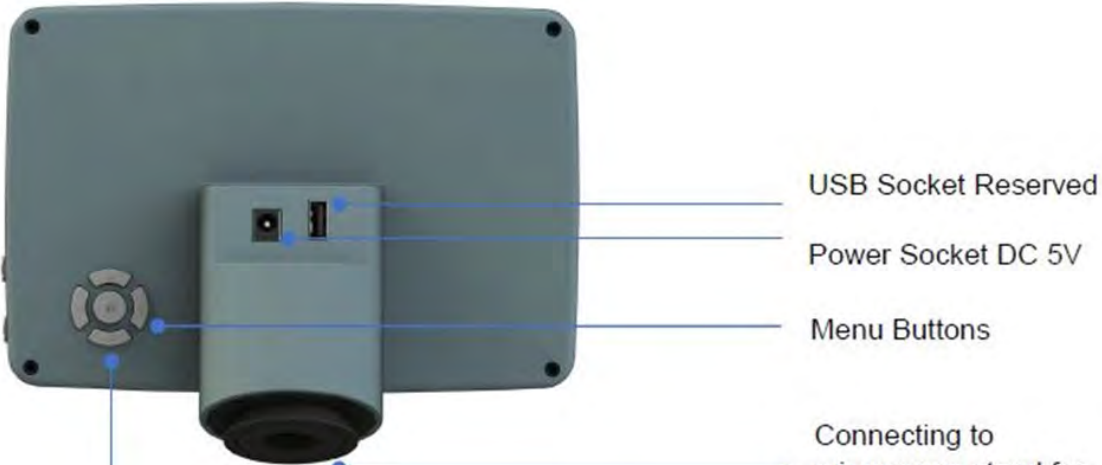


○ - Option

8 Plug in power supply



9 Nomenclature



10 All around the camera housing

10.1 Connect the power adapter (see chapter 8)

Insert the USB power adapter into the power socket on the back side of the display housing and to the OBT microscope. After power on, the red light will light up. Press the power button at this time, the indicator light will change from red to green, and the camera will start up.

10.2 Use the menu buttons (see chapter 9) to operate the interface

Use the menu buttons to operate the camera functions and adjust the camera parameters. After modifying the parameters, exit the interface to save. In the upper left corner of the screen, *Param. Saved* appears. This is shown in Figure 10-1.

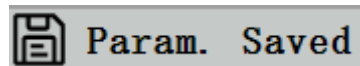


Figure 10-1

10.3 Snap

1. The snap button is on the right side of the display housing (above the power button). Press it to capture the current image on the screen and store it in the MicroSD card.
2. The screen shows the image name, which means that the picture has been taken successfully.



Warning:

Disconnect the power supply if the equipment is not used for a long time.

11 Menu and functions

After turning on the power and pressing the power button, wait for the screen to light up. At this point, press the menu button (see chapter 9) to call out the *Menu*. As shown in Figure 11-1.

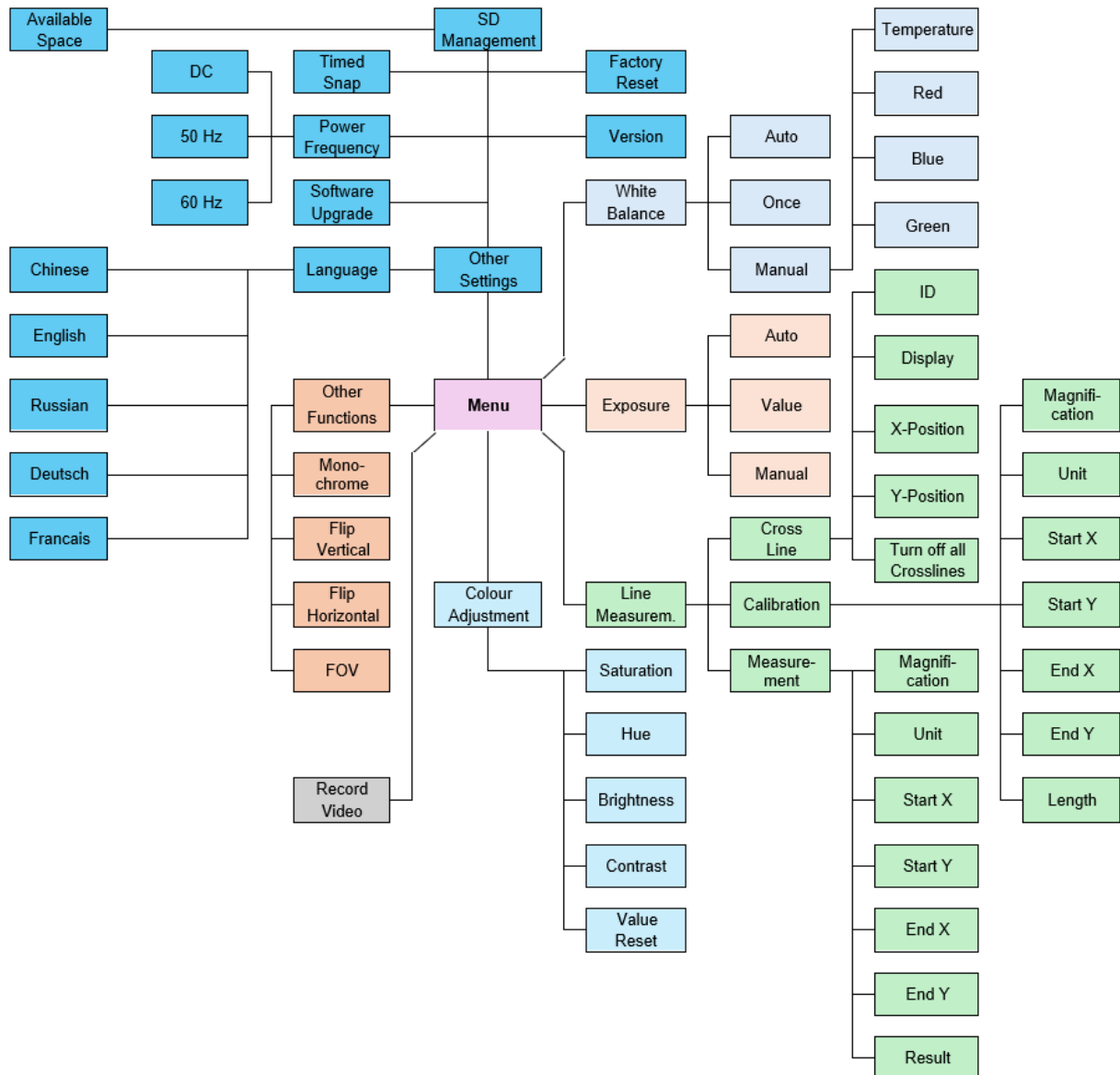
The position of the current cursor (that is, the position of the highlighted icon) is the *White Balance* function option.

Press $\uparrow\downarrow$ buttons for function selection, press \rightarrow to enter the sub-menu interface of the corresponding functions. Press the menu button to switch to the previous interface.



Figure 11-1

11.1 Program Structure



12 Operating Instructions

12.1 White Balance

After entering the White Balance menu, the default option is *Auto White Balance*, as shown in Figure 12-1.

When the effect of *Automatic White Balance* is not ideal due to the difference of color temperature between different light sources, manual white balance can be used to adjust the parameters of color *Temperature*, *Red*, *Blue* and *Green* respectively. This is shown in Figure 12-2.

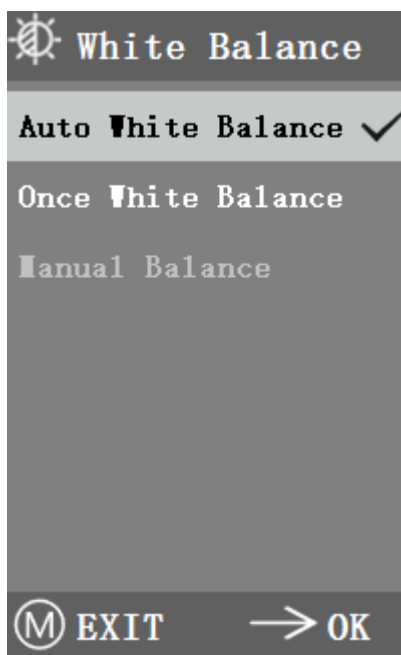


Figure 12-1

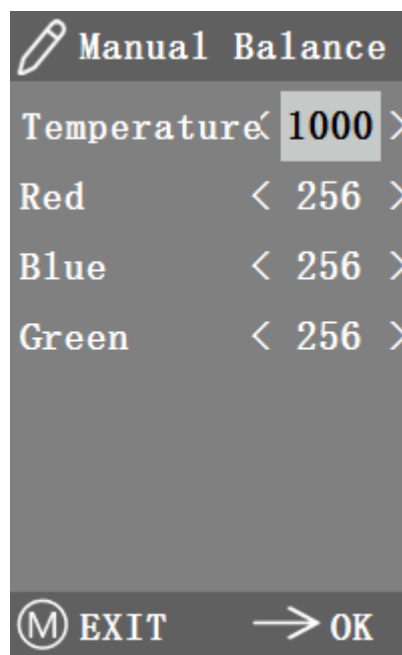


Figure 12-2

12.2 Exposure

After entering the *Exposure* menu, the default option is *Auto exposure*, as shown in Figure 12-3. Under automatic exposure, you can adjust the target *Value* to adjust the degree of exposure.

In *Manual Exposure*, you can also adjust the exposure by adjusting the value of exposure *Time*. As shown in Figure 12-4.

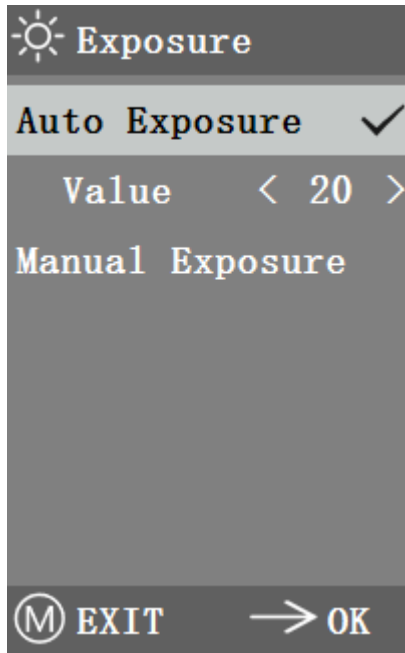


Figure 12-3



Figure 12-4

12.3 Line Measurement

This menu includes *Cross Line*, *Calibration* and *Measurement*. As shown in Figure 12-5.

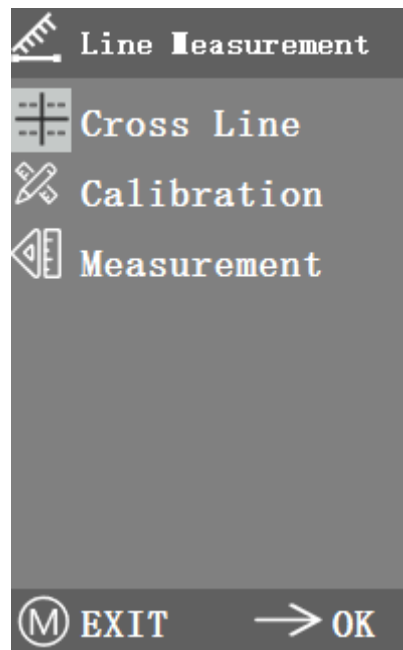


Figure 12-5

12.4 Cross Line

Four groups of crosslines are provided in red, blue, green and white colors. You can choose according to your requirements. Enter the *Cross Line* menu, as shown in Figure 12-6.

ID refers to the number of each group of crosslines. *Display* adjusts whether the reticle is displayed. *X Position* and *Y Position* adjusts the position of the center point of the reticle.

You can select and press the *Turn off All Crosslines* to close all crosslines.

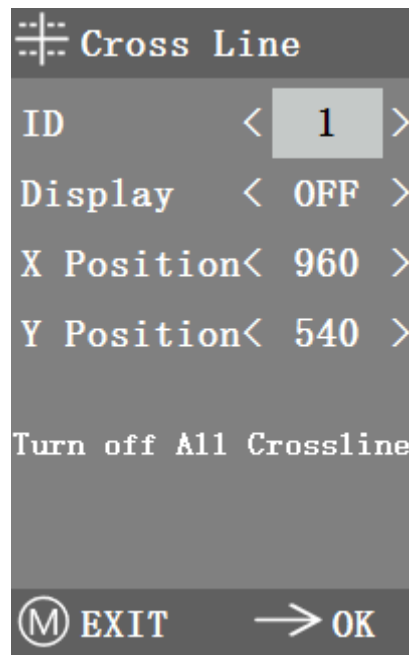


Figure 12-6

12.5 Calibration

There are default calibration values for this product. However, due to the different objective standards of the microscope, the calibration value may have errors, so it is suggested to recalibrate. The following is the calibration process.

1. Calibration requires a micrometer. Put the micrometer on the object platform and adjust the microscope so that the micrometer scale is clearly displayed on the screen. In order to facilitate calibration, it is suggested to rotate the camera so that the micrometer is placed horizontally in the screen without being blocked by the menu.
2. After entering the *Calibration* menu, it is shown in Figure 12-7.

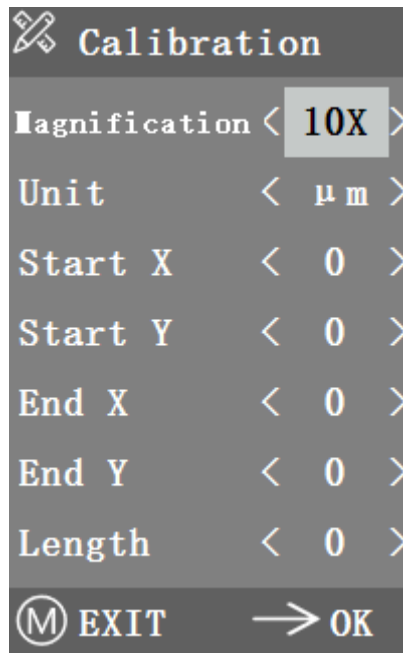


Figure 12-7

- Adjust the positions of the starting and ending points of calibration to make the calibration line coincide with the micrometer scale and try to select the length containing most possible multiple scales, so as to make the measurement more accurate.
- The minimum range of the selected micrometer is 0.01 mm (10 micron). Figure 12-8 shows the image under a 10x objective lens. At this time, the *Magnification* is set to 10x, the *Unit* is marked as μm , and the *Length* is set to 0.

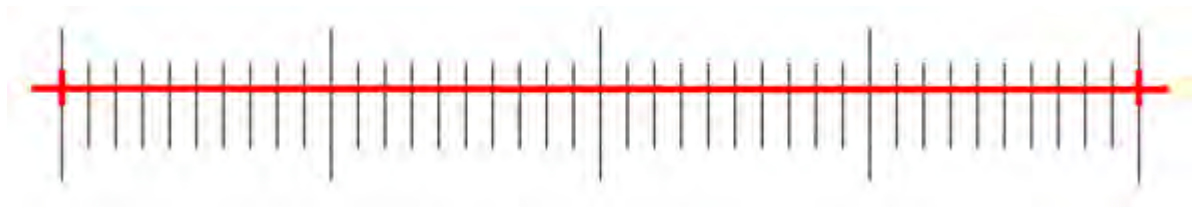


Figure 12-8

- After adjusting the parameters, exit the *Calibration* interface, and the calibration is completed.

12.6 Measurement

The image needs to be calibrated before it can be measured. And the calibration ruler of different magnification is different, so it needs to be calibrated separately under different objective lenses.

Enter the *Measurement* menu. Select the measurement *Magnification*, adjust the starting and ending point, and the measurement length is displayed at the bottom in real time, as shown in Figure 12-9.

Changes in the field of vision (FOV) did not affect the measurements.

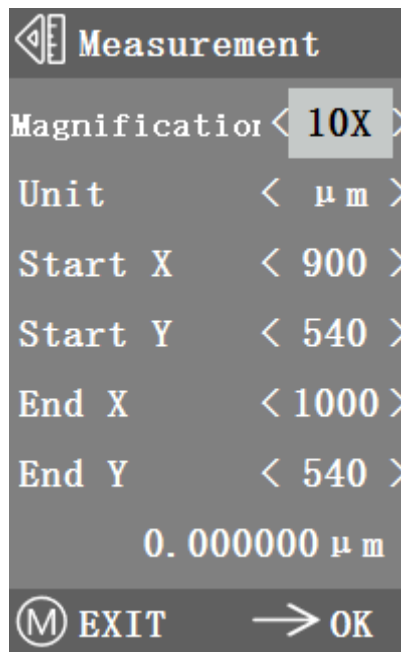


Figure 12-9

12.7 Color Adjustment

After entering the *Color Adjustment* menu, as shown in Figure 12-10, *Saturation*, *Hue*, *Brightness* and *Contrast* can be adjusted to make the picture reach the required level.

In order to facilitate the *Color Adjustment*, the *Color Value Reset* option is added in the menu. When selected and pressed, all the color values in the menu will be restored to the default value.

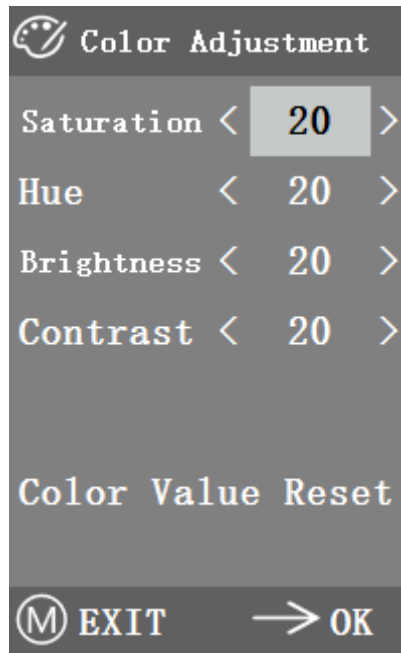


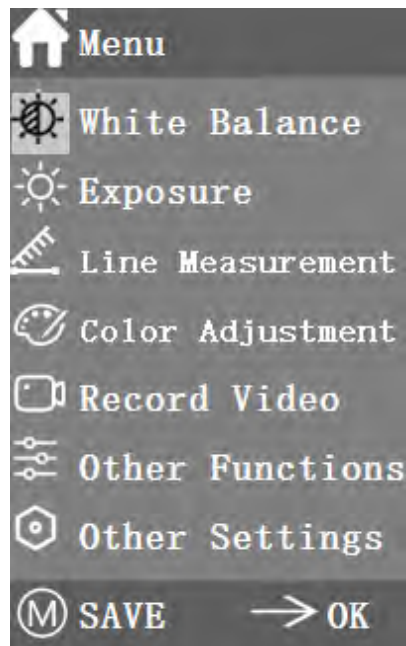
Figure 12-10

12.8 Record Video

1. Press *M* button (chapter 6) to show *Menu* in the screen (as in Figure 12-11) and choose *Record Video* item by up or down button.
2. Press right button to start recording. The recording time is shown separately. If you want to quit recording, just press the *M* button.



Before recording the video, you should check whether to insert an MicroSD card with a FAT32 file system and free space. You cannot take a photo during the recording process.



00:00:00

Figure 12-11

12.9 Other Functions

This menu includes functions of *Monochrome*, *Flip vertical*, *Flip horizontal* and *FOV*. The numerical option can be adjusted by ←→ key, and the switch options can be opened and closed by → key.

After the adjustment is completed and the main menu is closed, the function states will be saved. The function states will be retained when the next boot is started. As shown in Figure 12-12.

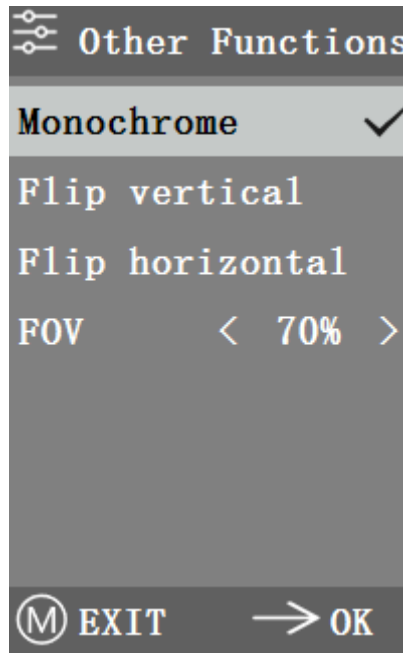


Figure 12-12

12.10 Monochrome

This function produces visual images in varying tones of a single color (such as gray).

12.11 Flip

This function is divided into vertical flipping and horizontal flipping.

12.12 Field of View (FOV)

This function can adjust the range of observation field. Use the ←→ key in the menu to adjust the size. When the menu is not displayed, press ↑↓ key to adjust, and 70% similar signs will appear in the upper left corner.

12.13 Other Settings

This menu contains *Power Frequency*, *SD Management*, *Timed Snap*, *Language*, *factory Reset*, *Software Upgrade*, *Version*. As shown in Figure 12-13.

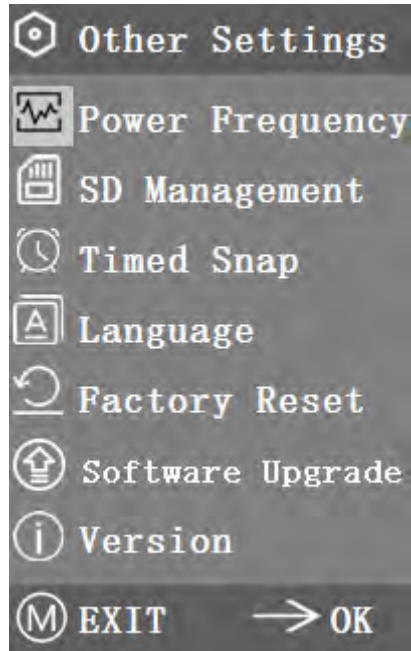


Figure 12-13

12.14 Power Frequency

CMOS detectors have a rolling curtain effect that causes flicker problems, which can be resolved by capturing a line of pixels as an integer (n) time the flicker period. Among them, 60 Hz in North America and 50 Hz in Europe. As shown in Figure 12-14.

1. DC (DC):
For DC (DC) light source, there is no light fluctuation, so there is no need to compensate the flashing light source.
2. AC (50 Hz):
Radio AC (50 Hz) to eliminate the dark strip of the lamp curtain caused by the 50 Hz fluorescent lamp.
3. AC (60 Hz):
Radio AC (60 Hz) to eliminate the dark strip of the lamp curtain caused by 60 Hz fluorescent lamp.

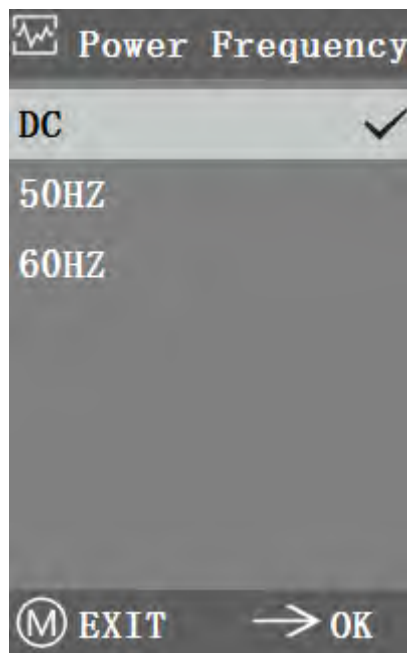


Figure 12-14

12.15 SD Management

After inserting the SD card, the remaining space and total space of the MicroSD card can be seen in *Available Space*, as shown in Figure 12-15.

If *0.00 GB / 0.00 GB* as shown in Figure 12-16, the MicroSD card was not successfully mounted, please try to reinsert it.



Figure 12-15



Figure 12-16

12.16 Timed Snap

Hours, Minutes and Seconds" refers to the time interval of *Timed Snap*, and *Counts* refers to the number of timed snaps.

After setting the parameters, move the cursor to *Timed Snap Start* and press → to start timed snap.

At this point, the number jumps below. This is the number of photos that have been successfully taken so far. As shown in Figure 12-17.

If the available space of MicroSD card is insufficient during the process of timed snap, it will exit.

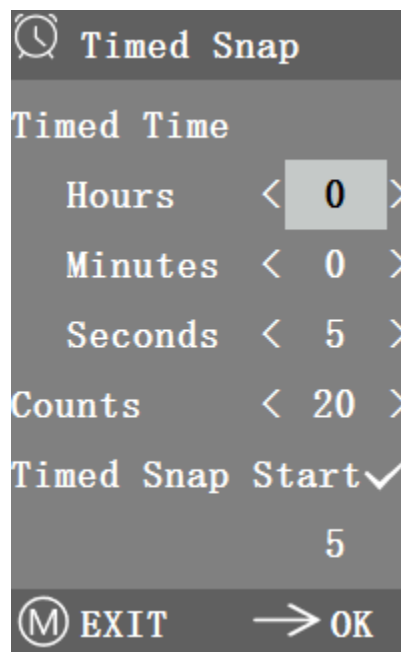


Figure 12-17

12.17 Language

The current version can switch between *Chinese, English Russian, German and Fench*, as shown in Figure 12-18.

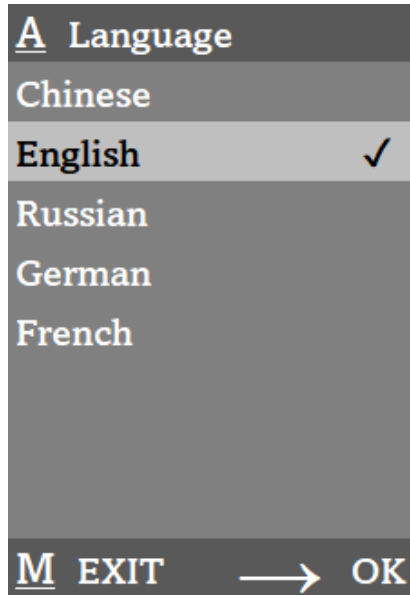


Figure 12-18

12.18 Factory Reset

Press → key to reset the menu settings to factory settings. This is shown in Figure 12-19.

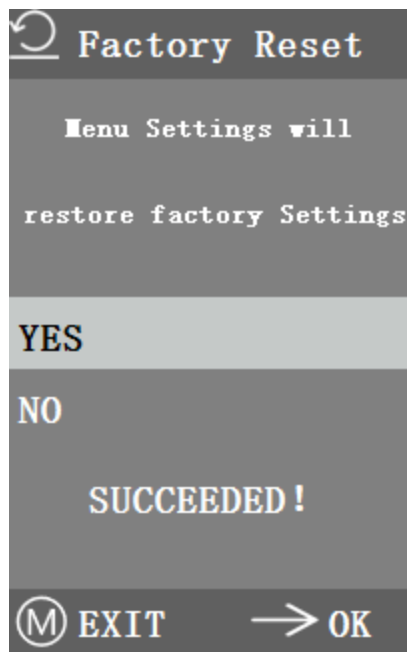


Figure 12-19

13 Failure analysis and troubleshooting

1. When pressing the snap button, recording videos, taking photos at a fixed time, or entering the SD card management menu, *NO SD-CARD* will be displayed, as shown in Figure 13-1. Please insert the SD card with file system FAT32 into the MicroSD card slot on the right side of the camera, and then carry out corresponding operations.

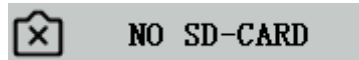


Figure 13-1

2. When pressing the snap button, recording videos, and taking photos at a fixed time, *No Available Space* will be displayed, as shown in Figure 13-2. Please sort out the SD card space on the computer before inserting the camera for use.

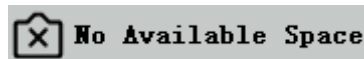


Figure 13-2

3. The camera screen image appears wavy pattern phenomenon, open *Other Settings - Power Frequency*, select the appropriate power frequency.
4. The image is blurry and out of focus. Please change the objective lens or microscope to observe again.
5. If the camera screen shows black when power on, and it restarted in around 15 sec., maybe the snap button or power switch is stuck, please make it return to normal position.
6. If an unknown problem occurs and cannot be solved by yourself, please press the power button for 10 sec. to restart. If it can be successfully reproduced, please contact the manufacturer to solve.

14 Maintenance and cleaning



Disconnect the appliance from the power supply before carrying out any maintenance and cleaning.

14.1 Cleaning

Clean the device with a damp, soft, lint-free cloth. Ensure that no moisture penetrates the housing. Do not use sprays, solvents, alcohol-based cleaners or abrasive cleaners, but only clear water to moisten the cloth.

When handled correctly and checked regularly, the microscope camera should give many years of efficient service.

14.2 Repairing

Do not make any changes to the appliance and do not install any spare parts. Contact your KERN-dealer or our technical department for repair or device inspection.

15 Disposal



Old appliances and accessories must not be disposed of with household waste. The operator must dispose of the packaging and appliance in accordance with the applicable national or regional legislation at the place of use.

The appliance consists of various components and materials, such as:

- Electronic components (circuit boards, electrical cables)
- Plastic (housing)
- Metal (hook)

Improper disposal of the appliance can have harmful effects on people and the environment.

Proper and environmentally friendly disposal can prevent harmful effects and recover raw materials.

+

16 Service

If, after studying the user manual, you still have questions about commissioning or using the microscope camera, or if unforeseen problems should arise, please get in touch with your dealer. The device may only be opened by trained service engineers who have been authorised by KERN.

17 Further information

The illustrations may differ slightly from the product.

The descriptions and illustrations in this user manual are subject to change without notice. Further developments on the device may lead to these changes.



All language versions contain a non-binding translation.
The original German document is the binding version.