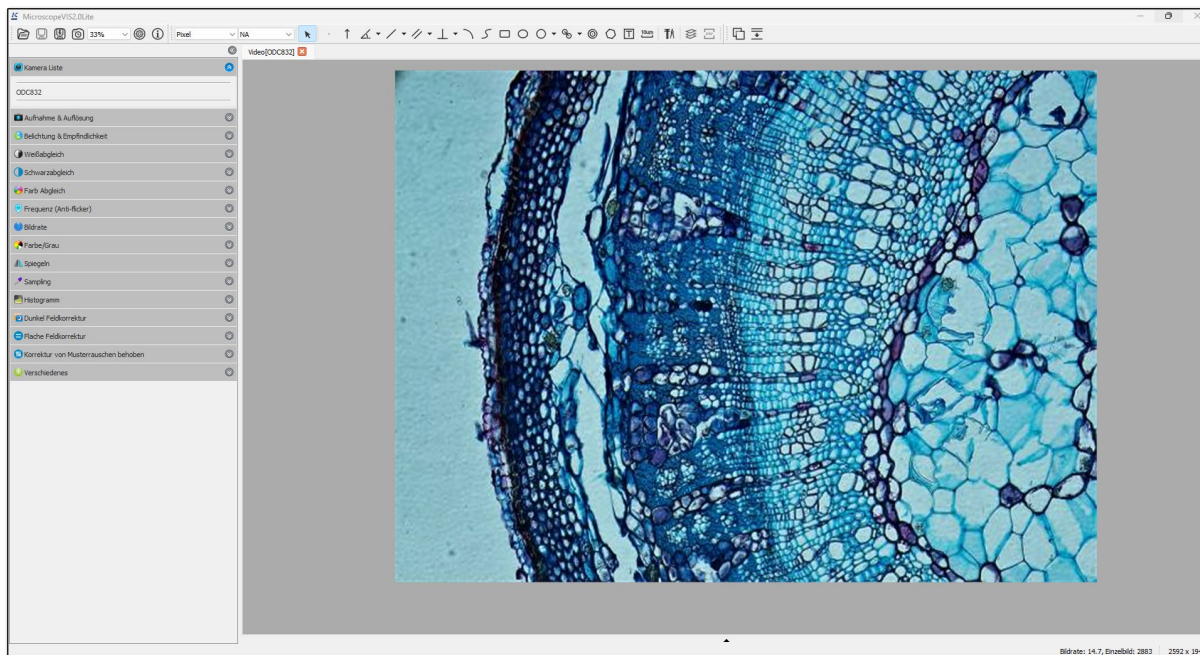




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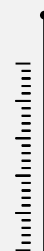
MicroscopeVIS2.0Lite

OXM 903



Operating Manual MicroscopeVIS2.0Lite

Version 1.0
2026-01
en
OXM-903-BA-e-2610



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OPTICS

KERN Optics MicroscopeVIS2.0Lite

Software

Operating Manual MicroscopeVIS2.0Lite

Version 1.0 2026-01

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1 Introduction

This software provides convenient control of your KERN microscope camera, as well as the ability to capture, display, and manage images and videos for your analysis. Enjoy precise image acquisition and intuitive operation for use in laboratories, research, and education.

2 Safety Instructions

- The software can only be used with the specified KERN microscope cameras.
- Save data in compliance with current data protection regulations.
- Store the microscope and camera in a clean, dry location and use the microscope's dust cover for protection.

3 System Requirements

Model KERN	OXM 903
Supported Operating Systems	Windows 7 or later
CPU	Intel Core i3 or equivalent
Clock Speed	2.5 GHz
RAM	2 GB
SSD-Storage	128 GB SSD
Graphics Card	NVIDIA GeForce RTX 3060 or equivalent
Display	13" Full HD, 1920x1080
Compatible Cameras	ODC 825, 832, 841, 852, 861, 874, 881, 895

Higher specifications are recommended for optimal performance.

4 Installation

- 1) Download the installation file from our website:

<https://www.kern-sohn.com/shop/de/downloads/>

The free microscope camera software VIS Lite can be found under the Software menu.

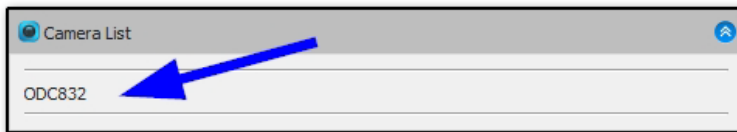
- 2) Run the setup and follow the on-screen instructions.
- 3) License activation is not required.

5 Getting Started

- 1) Connect the camera to the computer.
- 2) Launch the software using the desktop icon.



- 3) Select your camera from the camera list,
for example, the ODC 832.



6 Operation

The camera software offers various menu sections:

Main Menu, Camera Configuration, and Tools.

6.1 Main Menu



The main menu consists of:

(Explanation from left to right)

- Open File
- Save
- Quick Save
- Start Timelapse (Auto Capture)
- Zoom (10 % - 400 %)
- Settings Options (Storage Location, Language, Measurement Parameters, Object / Color Selection, Magnification)
- Version Info
- Select Unit
- Magnification
- Delete

6.1.1 Save – Quick Save

Save



Function:

Saves the changes made to the current image to a file without closing the image window.

Details:

If the image already has a file name, it will simply be overwritten.

If the image was newly created (e.g., by camera capture or “Paste as New File”), a “Save As” dialog will open to define the file name, storage location, and format.

The user must manually select the storage location and format.

Shortcut: *Ctrl + S*

Quick Save



Function:

Immediately saves a newly created or pasted image without requiring the user to define storage location, file name, or format.

Details:

Used for images that have just been captured or inserted.

The software applies the predefined rules from Options > Preferences > Quick Save (e.g., default folder, file name pattern, format).

Optionally, a rename dialog may appear if this setting is enabled.

Shortcut: *Ctrl + Q*

6.1.2 Delete

Function:

Removes selected elements from the current window.

Files in the Browse/Thumbnail window:

Deletes image files from the directory (they are moved to the Recycle Bin and can be restored).

Selection is made by clicking, multiple selection with CTRL or SHIFT.

Shortcut: Delete key or Right-click → Delete.

Measurement objects in the image view:

Removes selected measurement objects from the active layer.

Selection is made beforehand via Measurement > Select Measurement Object.

Shortcut: Delete key or Menu Edit > Delete.

Important Notes:

The background layer cannot be deleted, only measurement objects or additional layers.

Deleted files in the Browse window are moved to the Windows Recycle Bin.

For measurement objects: deletion only affects the current layer, not the image itself.

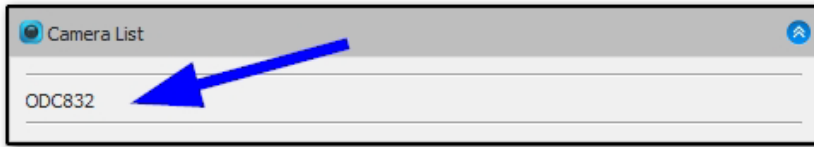
6.2 Camera Configuration / Tips & Application



Note:
Depending on the camera used, not all functions are active because the camera hardware does not support them. Therefore, some functions may be hidden after the camera is connected.

6.3 Recommendations & Application Tips

6.3.1 Camera List



Tip: Select the correct camera before making any adjustments. If multiple cameras are connected, incorrect settings may otherwise be applied.

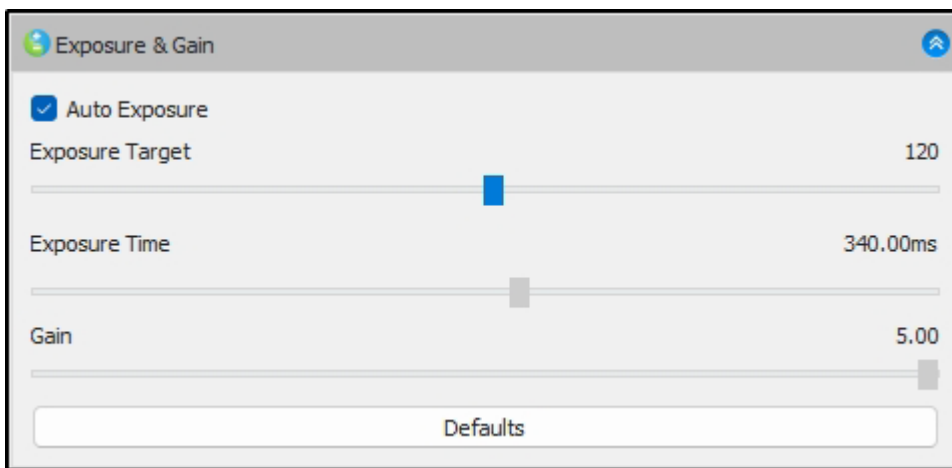
6.3.2 Capture & Resolution



Recommendation: Use a higher resolution for detailed analysis and a lower resolution for quick previews or live streaming.

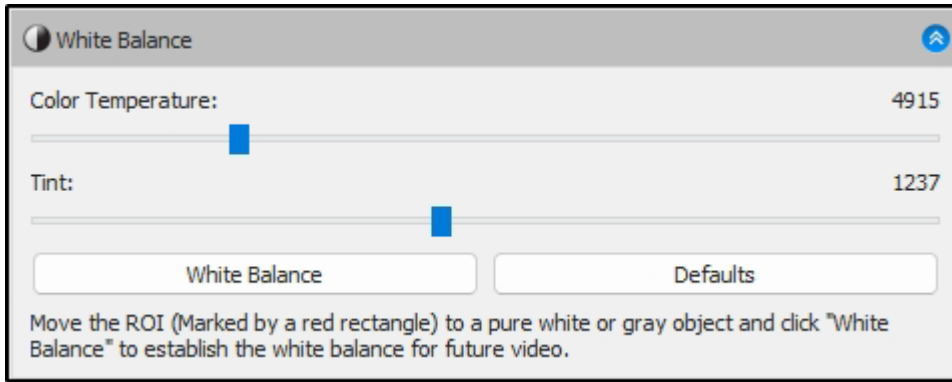
Note: Higher resolution requires more processing power.

6.3.3 Exposure & Gain



Tip: Use automatic exposure for consistent results. For very dark samples: Increase sensitivity, but be aware of image noise.

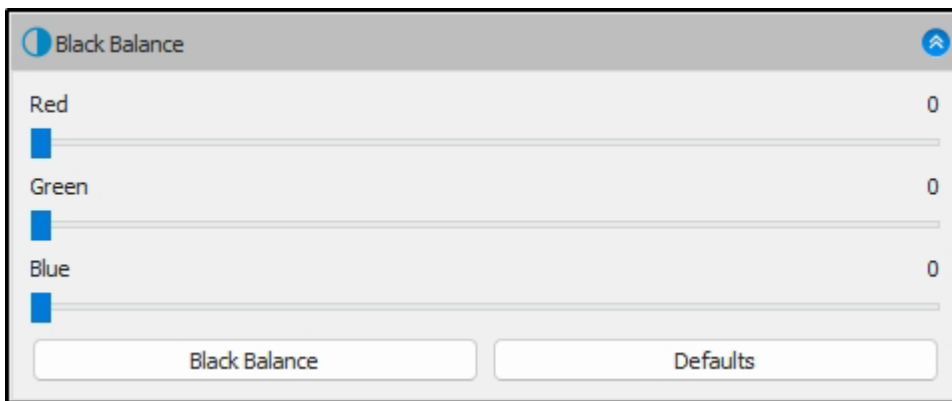
6.3.4 White Balance



Recommendation: Check white balance regularly, especially when using changing light sources.

Tip: For accurate color reproduction, adjust manually.

6.3.5 Black Balance / Black Level / Color Adjustment



Function: Ensures that the black level in the image is correct by defining a reference area as “black.”

Procedure: In the video window, a magenta frame labeled “Black Balance” appears. Drag this frame onto an area that represents pure black. Click Black Balance → The software creates a black level map for all subsequent images.

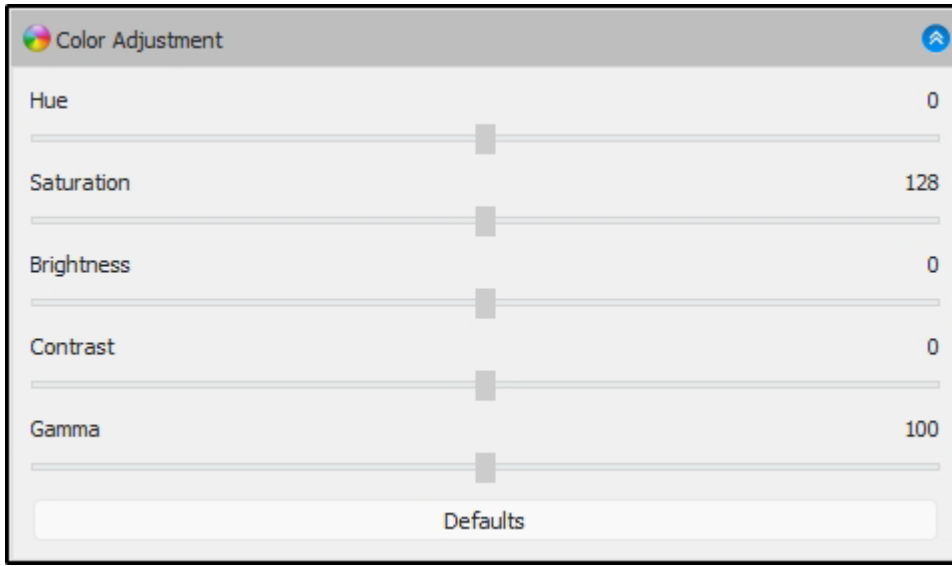
Manual: The black level can be adjusted using sliders for Red, Green, and Blue.

Note: After activation, the frame disappears. Defaults resets all values.



The black level is the baseline value for the darkest areas of the image. It is defined by the black balance and influences overall image dynamics.

Falscher Schwarzwert → Bild wirkt milchig oder zu kontrastarm.



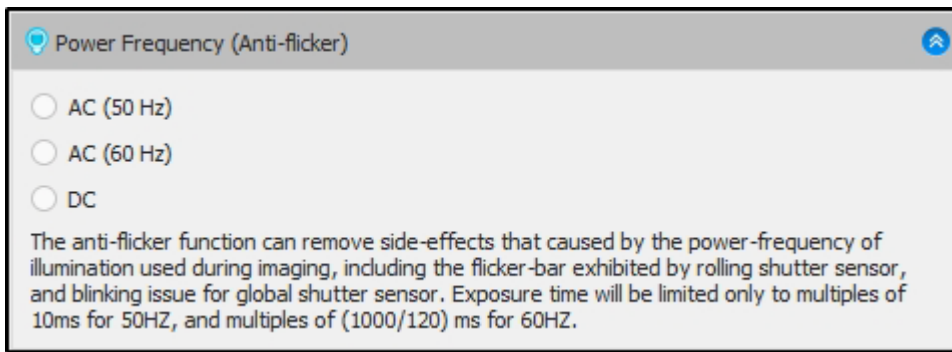
Function: Ensures that white appears neutral in the image and that colors are reproduced accurately.

Procedure: In the video window, a red frame labeled “White Balance” appears. Drag this frame onto a neutral white or gray area. Click White Balance → The software creates a color map for all subsequent images.

Manual: The balance can be adjusted using sliders for color temperature and hue.

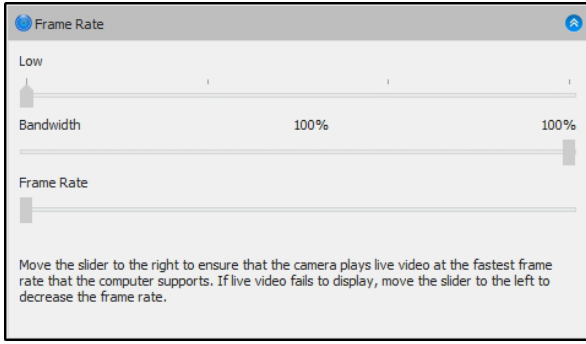
Note: Defaults reset all values.

6.3.6 Power Frequency (Anti-Flicker)



Tipp: For LED or fluorescent lamps, set the appropriate mains frequency (50 Hz / 60 Hz) to prevent flicker.

6.3.7 Frame Rate



Recommendation: Use a higher frame rate for live motion and a lower frame rate for static samples (saves resources).

6.3.8 Color / Grey



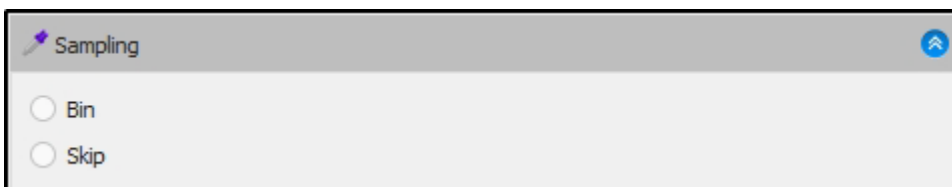
Tip: Use grayscale mode for pure structure or contrast analysis.

6.3.9 Flip



To flip the live image horizontally or vertically.

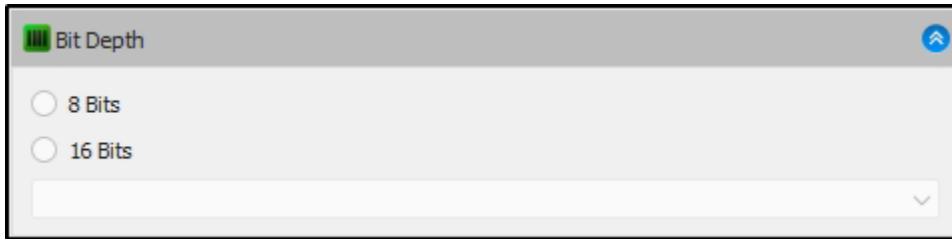
6.3.10 Sampling



The “Sampling” function in the camera sidebar controls how pixels are read from the sensor and processed for preview or image capture.

Tip: If you select a lower preview resolution, “Bin” is recommended to maintain a good signal-to-noise ratio.

6.3.11 Bit Depth



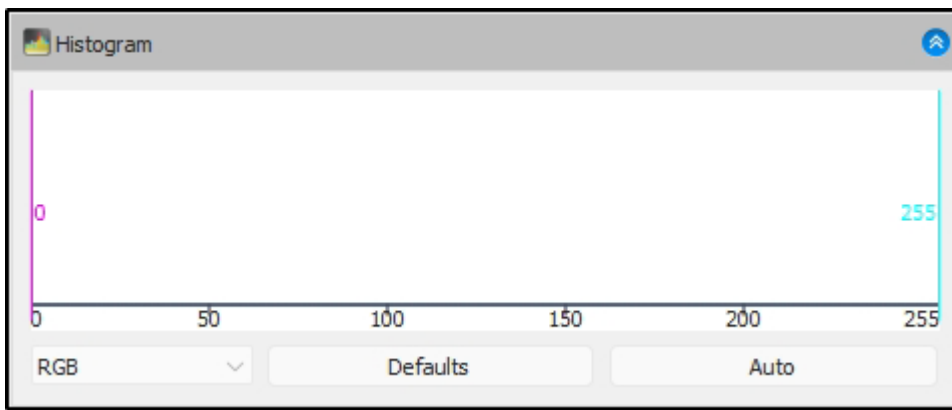
Bit depth determines how many brightness levels per color channel can be stored.

RGB24 = 8 bits per channel (24 bits total)

RGB48 = 16 bits per channel (48 bits total, for high-quality image storage)

Note: Higher bit depth provides better detail and dynamic range but also requires more memory and processing speed.

6.3.12 Histogram



The histogram displays the brightness and color distribution of an image or video. It is an important tool for assessing exposure and image quality.

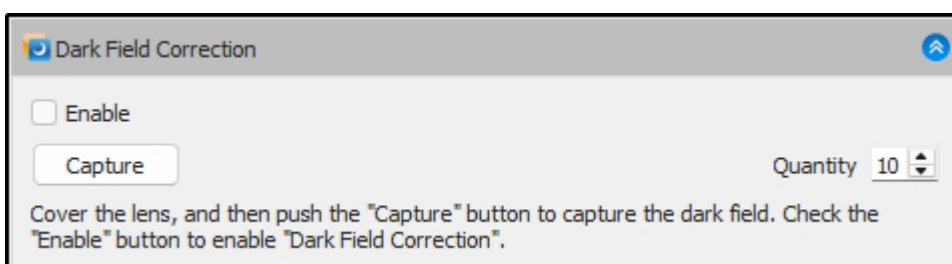
The X-axis of the histogram represents brightness values (left = dark, right = bright).

The Y-axis shows the number of pixels for each brightness level.

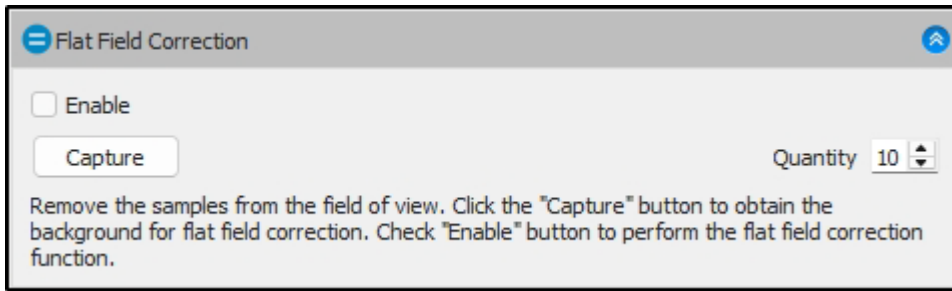
For color images, the RGB channels (Red, Green, Blue) can be displayed individually or combined.

Recommendation: Check exposure using the histogram – avoid clipped areas (overexposure or underexposure).

6.3.13 Dunkelfeld- und Flächefeldkorrektur



Reduces thermal noise and pixel artifacts that occur during long exposure times or at high gain levels (typical for CMOS or uncooled CCD sensors).



Corrects brightness and color deviations in the image caused by uneven illumination or optical vignetting.

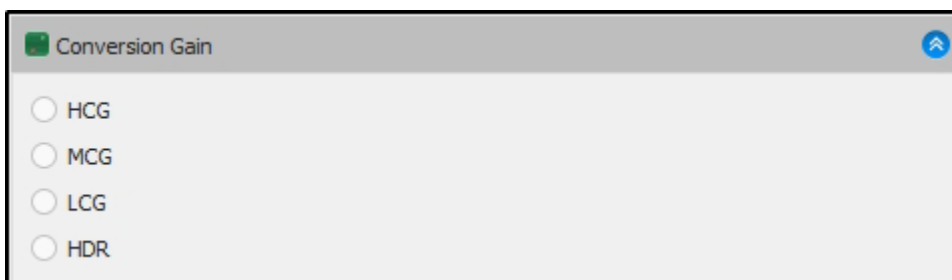
Tip: Both corrections significantly improve image quality, especially for quantitative measurements or documentation. They should be applied before capturing the actual image whenever the lighting or camera settings have been changed.

6.3.14 Fixed Pattern Noise Correction



Recommendation: Enable this feature at high sensitivity settings to minimize unwanted noise.

6.3.15 Conversion Gain



Note: Ratio between the electrical charge (electrons) generated in the pixel by light and the digital value (ADU – Analog-Digital Unit) output by the A/D converter.

High conversion: Good for low-light conditions, but increases noise.

Low conversion: Suitable for bright scenes, providing better signal quality and dynamic range.

Selection: HCG = High Conversion Gain
MCG = Medium Conversion Gain
LCG = Low Conversion Gain
HDR = High Dynamic Range

6.3.16 Cooling / Heating



Purpose: Reduces thermal noise from the sensor (especially during long exposure times or at high gain levels). Stabilizes temperature for reproducible results.

Typical applications: Fluorescence or long-exposure imaging, high-precision quantitative measurements.

Effect: Less image noise, improved signal quality. Extends sensor lifespan.



Purpose: Maintains the sample at a defined temperature (e.g., for live cells or chemical reactions). Prevents condensation on the objective or camera under high humidity conditions.

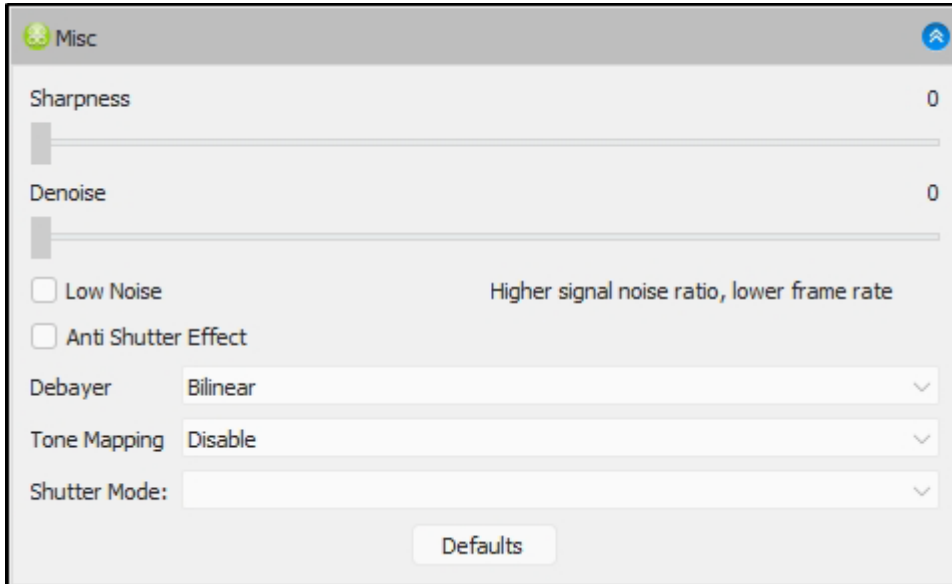
Typical applications: Live-cell imaging (37 °C for cell cultures), experiments involving temperature-dependent processes.

Note: Cooling and heating functions are only available if the camera or system includes the required hardware. For standard cameras without temperature control, these options are inactive.

Cooling: Available only on scientific cameras with an integrated Peltier element or external cooling module (ODC 861 only).

Heating: Usually not integrated in the camera but provided by heated stages or incubation systems for samples.

6.3.17 Misc



Sharpness:

Controls image sharpness.

Higher value = stronger sharpening, lower value = neutral.

Denoise:

Reduces image noise.

Higher value = stronger noise reduction, may smooth out details.

Low Noise / Higher SNR, Lower Frame Rate:

Activates a mode for noise reduction at the expense of frame rate.

Ideal for static images, less suitable for live video.

Anti-Shutter Effect:

Prevents rolling shutter artifacts (e.g., distortions during motion).

Relevant for CMOS sensors.

Debayer:

Selects the method for converting RAW Bayer data into color images.

Options: e.g., Bilinear, HQ Linear, VNG (depending on software).

Tone Mapping:

Controls HDR rendering.

Options: Enable / Disable / various algorithms.

Shutter Mode:

Selects the shutter type: Rolling Shutter or Global Shutter (depending on camera).

Global Shutter = no motion distortion, Rolling Shutter = standard for CMOS.

Presets:

Resets all values to default.

6.4 Tools



This menu contains tools for drawing, measuring, and editing:

(Explanation from left to right)

Basic settings for operating the software and exiting a function

In MicroscopeVIS2.0Lite, this corresponds to general GUI/options as well as canceling or leaving active tools (e.g., by pressing Esc or switching to another tool).

Windows can be closed with Ctrl+W; global settings are available under Options and in the sidebars.

Point

Measurement object “Point”: Places a marker and displays its coordinates/position; often used as a reference for further measurements.

Arrow for highlighting sample features

Annotation arrow: A graphical marker to emphasize features in the sample; does not affect the image (layer-based).

Angle measurement in the sample

Measurement object “Angle”: Available as 3-point or 4-point angle; output in ° (or rad/ π adjustable).

Length / Distance measurement

Measurement object “Line/Segment”: Measures distances between points; variants for free, horizontal, vertical, or multi-point segments.

Parallelism measurement

Measurement object “Parallel Lines” or “Double Parallels”: Checks/visualizes distances and parallelism of two-line sets.

Perpendicular measurement to a reference line

Measurement object “Perpendicular”: Constructs an orthogonal line to a reference line and measures its distance.

Circle via three-point method for area measurement

Measurement object “Circle (3-Point)”: Defines a circle from three edge points; provides diameter, radius, area.

Freehand line measurement

Measurement object “Freehand Polyline”: Measures length along a freely drawn path (segmented, total length).

Rectangle for feature bounding

Measurement object “Rectangle”: Usually drawn via two corner points; outputs width/height/area; also serves as ROI.

Ellipse for feature bounding

Measurement object “Ellipse”: Drawn via center/radius or two points; outputs major/minor axis, area.

Circle with diameter display

Measurement object “Circle (Diameter)”: Defines a circle via diameter endpoints; shows d, r, circumference, area.

Two circles on the same axis for diameter comparison

Measurement object “Two Circles on One Line”: Useful for comparing two holes/objects along an axis; measures both diameters and distance.

Concentric circles for diameter comparison

Measurement object “Concentric Circles”: Creates two (or more) circles with the same center; compares inner/outer diameter, wall thickness.

Polygon for area measurement

Measurement object “Polygon”: Arbitrary number of vertices; outputs area, perimeter, optionally centroid.

Text field for comments or labels

Measurement object/annotation “Text”: Labels with configurable font size/style/color; appears in measurement table and can be exported to Excel/CSV.

Scale bar toggle

Tool “Scale Bar”: Displays or hides a scale bar; length and unit depend on calibration/magnification.

Calibration

Calibration: Sets the pixel-to-length unit (px → μm/mm etc.); required for accurate measurements and scale bar.

Layer Mode

MicroscopeVIS2.0Lite uses a layer-based approach: Measurements/annotations are placed on separate layers above the background image; layers can be shown/hidden, named, merged (F2), and exported to Excel (F3).

CSV Export

Measurement data (length, angle, area, diameter, etc.) can be exported directly from the measurement table or layer list as CSV; Excel export is also available.

Stitching

“Stitching”: Combines multiple overlapping images into a larger field of view; in video mode with special options (roll mode, automatic edge cropping, constant exposure).

EDF

EDF (Extended Depth of Field): Combines a focus stack series (same image size required) into a consistently sharp result; fusion methods: Maximum Contrast (default), Weighted Average, Overlay.

6.4.1 What is the Layer Mode?



Layer refers to a software technique where different objects (e.g., measurements, annotations) are placed on separate layers above the image.

Purpose:

Measurements and annotations can be added without altering the original image.

Layers can be shown or hidden to control the view.

Background Layer:

Contains the actual image. This layer cannot be deleted.

Measurement Layers:

Used to place measurement objects (lines, angles, circles, text).

Operations:

Create a new layer (Layer > New)

Delete a layer (only non-active layers)

Rename a layer

Set a layer as Active Layer (for editing)

Show/Hide a layer

Merge all layers into the image (Fusion to Image – irreversible!)

Why is this important?

Measurements remain independent of the image and can be exported or modified later.

Ideal for documentation and analysis since the original image remains unchanged.

6.4.2 Exporting Measurements via CSV

If measurements have been taken in an image, they can be exported to a .csv file using the CSV export function.

In a separate program window, you can define the desired storage path and file name.

Important:

This function is only available after measurements have been performed!

6.4.3 What does Stich mean?



Function:

Combines all layers (including their measurement objects) into the image.

This means:

All measurements, text, and annotations are permanently embedded in the image.

After merging, the objects can no longer be edited individually.

Purpose:

Used when preparing the image for export or sharing, and no further changes to measurement objects are required.

Warning:

This process is irreversible – once merged, measurement objects cannot be removed or modified.

Always save a copy of the original image before merging.

Only merge when all measurements are complete.

6.4.4 What does EDF mean?



EDF = Extended Depth of Field

EDF (Extended Depth of Field) is a function that combines multiple images taken at different focus levels (Z-axis) into one image with consistently sharp detail.

Purpose:

In microscopy, depth of field is often limited. EDF allows structures at different focal planes to appear sharp simultaneously.

Dynamic EDF (Video Window)

Performed directly in live video mode.

The user moves the microscope's fine focus (Z-axis) while the software continuously captures images and fuses them into one sharp composite image.

Three Fusion Methods Available:

Maximum Contrast (recommended)

Weighted Average

Overlay Method

EDF in Browse/Thumbnail Window

Multiple previously captured images are selected and merged.

Advantage: Lower memory usage since images do not need to be opened.

EDF in Image Window

For already opened images.

Disadvantage: Higher memory load and slower performance with many images.

Important Settings

Disable Auto Exposure during EDF to ensure consistent brightness.

Use high frame rate and short exposure time for dynamic EDF.

Move the focus slowly so the software can align images correctly.

6.4.5 Notes for Practical Work in MicroscopeVIS2.0Lite

- ✓ Calibrate before each measurement: Define the unit ($\mu\text{m}/\text{mm}$) and pixel size; otherwise, lengths, areas, and angles will only be displayed in pixels.
- ✓ Use layers: Perform measurements and annotations on layers to keep the raw image unchanged. Export layers to Excel/CSV if needed or merge layer → image (F2).
- ✓ Keep scale bar consistent: The scale bar length is based on calibration and the selected magnification. Always check after changing optics.
- ✓ Stitching & EDF: For accurate results, keep exposure and white balance as constant as possible (disable Auto Exposure beforehand). For EDF, ensure all images have the same size.

6.5 FAQ – Frequently Asked Questions

Possible FAQ Questions	Answers
Why can't I see a live image in the software?	<p>Check the following:</p> <p>Make sure the camera is correctly connected and selected in the software (Camera List).</p> <p>Ensure that the microscope's light path is switched to the camera (e.g., lever or slider for the camera port).</p>
How do I switch between the eyepiece and the camera?	<p>The microscope is equipped with a switching mechanism (beam splitter) that redirects the light path.</p> <p>Use the lever or slider to switch the light either to the eyepieces or to the camera port.</p> <p>Tip: On some models, a 50/50 split is possible, allowing simultaneous viewing through the eyepieces and the camera.</p>
Why is the image too dark or too bright?	<p>Check the exposure and sensitivity settings in the software.</p> <p>Adjust the illumination on the microscope correctly.</p> <p>Use the histogram to monitor and control brightness.</p>
How do I adjust the colors correctly?	<p>Perform a white balance, especially when changing light sources.</p> <p>Use the color adjustment feature to achieve natural color reproduction.</p>
The image flickers – what should I do?	<p>Set the Anti-Flicker frequency in the software to 50 Hz (Europe) or 60 Hz (USA).</p> <p>Check the light source (LED or halogen).</p>
Which resolution should I choose?	<p>High resolution for detailed analysis and documentation.</p> <p>Low resolution for fast live preview.</p>
How can I avoid reflections or artifacts?	<p>Enable dark-field and flat-field correction.</p> <p>Keep the camera and optics clean.</p>
Why are some functions grayed out?	<p>Not all camera models support all functions.</p> <p>Check compatibility in the Camera List.</p>

How can I prevent image noise in low-light conditions?	Do not increase sensitivity too much. Activate pattern noise correction. Use cooling (if available) for long-term exposures.
How do I save images in the best quality?	Select the highest bit depth (e.g., 16 bits for analysis). Suitable format: TIFF for lossless storage.