Instruction Manual

ZEISS Axiocam 212 color / 203 mono

Microscope Camera

ZEISS Axiocam 212 color / 203 mono

Original Manual

Carl Zeiss Microscopy GmbH
Carl-Zeiss-Promenade 10
07745 Jena
Germany
info.microscopy.de@zeiss.com
www.zeiss.com/microscopy

UK Importer

Carl Zeiss Ltd
1030 Cambourne Business Park, Cambourne
CB23 6DW Cambridge
United Kingdom

Carl Zeiss Suzhou Co., Ltd.
No. 26 Wusheng Road, SIP
215126 Suzhou
China

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Content

1 About this Instruction Manual

This Instruction Manual (further called "document") is considered to be part of the microscope camera, herein after referred to as the "product" or the "camera".

This document contains basic steps and safety information that must be observed during operation and maintenance. Therefore, the document must be read by the operator prior to commissioning and must always be available at the place of use of the product.

This document is an essential part of the product and, if the product is resold, the document must remain with the product or be handed over to the new owner.

1.1 Introduction

Welcome to the Axiocam 212 color and Axiocam 203 mono instruction manual.

These microscope cameras are multi-functional digital CMOS cameras for use in light microscopy applications. To make it easier for you to set up the camera, follow the instructions in these chapters step by step.

Content

Chapter	Content
About this guide	Introduction and overview of this manual.
Safety	Important information on the safe handling of the camera. **Read this chapter before unpacking and operating the camera.**
Technical data	Here you will find your camera's technical data.
Shipment	The contents of delivery and optional attachments will be described here.
Connecting the camera	In this chapter, you will find detailed instructions on connecting and using the camera.
OSD menu	This chapter lists the functions of the On Screen Display (OSD) menu.
Installing software and drivers	Here you will learn how to install the software and camera drivers.
Acquiring Images and Videos	This chapter provides the basics of image and video acquisition.
Troubleshooting	In this chapter, we have listed some solutions to various problems. If you are still unable to solve your problem, contact ZEISS support.
Maintenance	This chapter describes some measures for the maintenance and care of your camera. In case of greater damage, always contact ZEISS support.
Disposal and Recycling	Important instructions for disposal and recycling.

1.2 Safety

1.2.1 Intended Purpose

The cameras are high definition cameras for color and monochromatic imaging, respectively. They are suitable for use as accessories for educational and routine microscopy in laboratory environments and for use by trained laboratory personnel. The cameras have been designed to be used in the field of light microscopy for general observation, routine work, and simple applications in which a sufficient amount of light is available.

These cameras should only be used for training and research. The images / videos from these cameras must not be used for the direct generation of diagnostic results.

1.2.2 EMC Information

The product is intended to be used in an industrial electromagnetic environment.

CAN ICES-001 (B) / NMB-001 (B)

FCC EMC Info This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The product complies with the emission and immunity requirements as a CISPR 11 / EN 55011 / class B group 1 system according to IEC 61326-1. Emissions, which exceed the levels required by CISPR 11 / EN 55011, can occur when the product is connected to other devices.

The following EMC user notice is for Korea only:

기종별	사용자안내문
B급기기 (가정용 방송통신기자재)	이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

1.2.3 Prevention of Hazards

ZEISS cameras have been manufactured and tested by ZEISS according to the regulations specified in CE and have left the manufacturer's premises in perfect working order. In order to ensure that this condition is maintained and to avoid any risks when operating the system, the user must comply with any notes and warnings contained in this manual. The manufacturer shall be exempt from statutory liability for accidents should the operator fail to observe the safety regulations.

Risk of personal injury To avoid the risk of fire or explosion, do not use the camera near inflammable liquids or gases.

Setup, expansions, re-adjustments, alterations, and repairs must be carried out only by persons who have been authorized by ZEISS.

Do not allow any cables, particularly power cords, to trail across the floor, where they can be snagged by people walking past.

Protect the cables from excessive heat (e.g. halogen lamps, microscope fluorescence illumination).

To avoid injuries due to potentially high surface temperatures, do not touch the camera's surface for a prolonged time.

Do not position the equipment in a way that makes it difficult to operate or disconnect the device.

If there were any cracks or deterioration on the power adapter, stop to use the microscope camera immediately. Contact the ZEISS partner for the service.

Several country-specific plugs are provided with the power adapter. To avoid the risk of electric shock or overheat, always use the appropriate one to your country. If in doubt, contact your ZEISS partner for help.

Always check the completeness of the device before handing it over to the students for each operation.

Risk of equipment damage

Protect the camera against mechanical impact. External damage may affect the operation of inner components.

To protect the camera's internal optical components, always screw the protective cap onto the camera's C-Mount thread when no lens and no adapter with optics is mounted to it.

Keep chemicals and fluids away from the camera.

Use the camera in a clean and dry location.

Use only the accessories supplied by ZEISS, when applicable.

Use only normal microscope cleaning material to clean the camera housing.

Contact your local ZEISS service organization if a repair is necessary. Do not disassemble the camera by yourself, otherwise the warranty will be lost.

Risk of data loss and data corruption

Make sure there is sufficient ventilation of the camera head. Avoid direct exposure to sunlight and locations near heat sources (radiators, stoves). Overheating can cause noisy images.

Attach all connectors firmly and securely.

Save all your data, such as images, measurement data, archives, reports, forms and documents, at regular intervals on an external storage medium. Otherwise it cannot be avoided that access to this data may be lost as a result of operational errors or hardware defects. ZEISS accepts no liability for consequential damage resulting from insufficient data protection.

1.2.4 Limitation of Liability

No warranty shall be assumed by ZEISS during the warranty period if the equipment is operated without observing the safety regulations. In any such case, ZEISS shall be exempt from statutory liability for accidents resulting from such operation.

1.2.5 Warranty

ZEISS shall be exempt from any warranty obligations should the user fail to observe the safety regulations. ZEISS only guarantees the safety, reliability, and performance of the system if the safety notes are closely observed.

1.2.6 Warning labels

All points that may pose special risks are additionally marked by warning labels (pictograms) on the camera. These warning labels indicate possible dangers. They are part of this instruction manual. They are to be kept in a clean and legible state. Warning labels that are damaged or no longer clearly legible must be replaced immediately. Always observe all warning labels on the camera.

1.2.6.1 Position of the Warning Labels

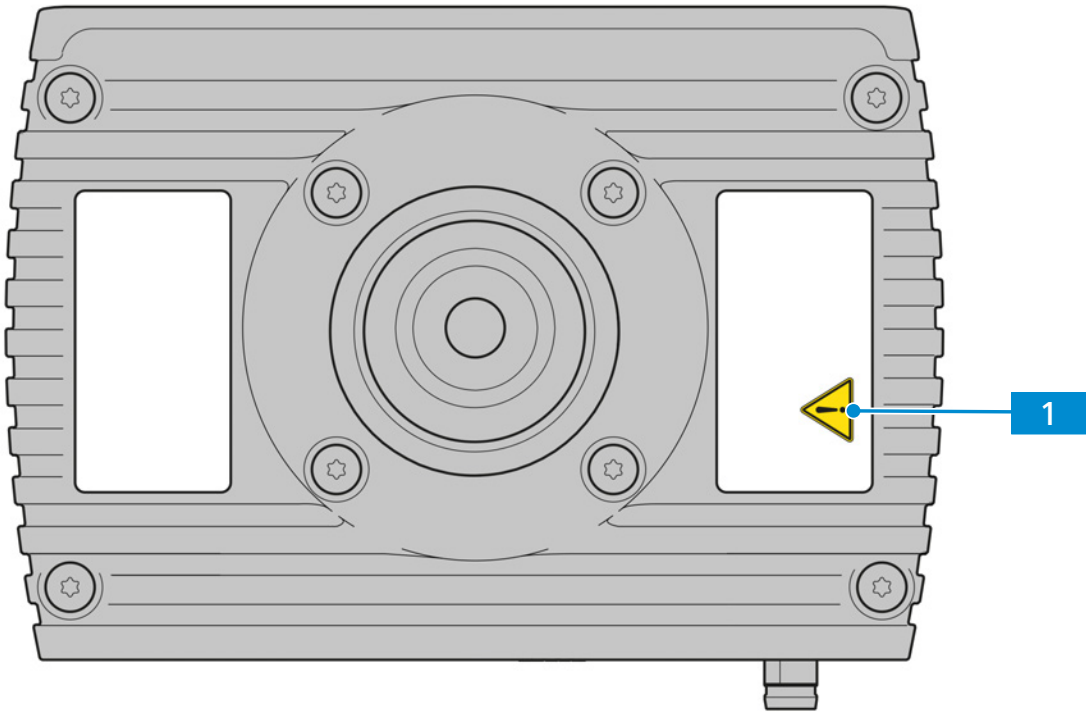


Fig. 1: Warning labels on the camera

1.2.6.2 Meaning of the Warning Labels

The meaning of each warning label is explained below.

No.	Symbol	Description
1		Follow the notes in the instruction manual and the supplied documents. For more information, see *Prevention of Hazards [▸ 6]*.

Tab. 1: List of attached Warning Labels

1.3 Explanation of Warning Messages and Additional Information

CAUTION, and NOTICE are standard signal words used to determine the levels of hazards and risks of personal injury and property damage. Not only the safety and warning messages in the **Safety** chapter are to be considered also all safety and warning messages in other chapters. Failure to comply with these instructions and warnings can result in both personal injury and property damage and involve the loss of any claims for damages.

The following warning messages indicating dangerous situations and hazards are used in this document.

⚠ CAUTION

Type and source of danger

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Type and source of danger

NOTICE indicates a potentially harmful situation which, if not avoided, may result in property damage. In addition, NOTICE warns of data loss or corrupt data as well.

Info

Provides additional information or explanations to help the operator better understand the contents of this document.

1.4 Explanation of Symbols

	CE marking (Conformité Européene)
	UKCA marking (UK conformity assessed)
	CSA label: product tested by CSA to meet U.S. and Canadian standards. CSA approval master number optionally given adjacent to this symbol
	KC mark accompanied with KC code
	Manufacturer
	Country of manufacture. "CC" is the country code, e.g. "DE" for Germany, "CN" for China. Date of manufacture optionally given adjacent to this symbol
	Importer
	Serial number
	Catalogue number
	Model number
	EFUP (Environmentally Friendly Use Period) of 50 years. According to the China RoHS regulation, it refers to the period during which the hazardous substances contained in an electronic or electrical product do not leak or mutate suddenly under normal operating conditions and will not result in serious environmental pollution or cause serious damage to the user's body or their assets during normal use.
	WEEE label: Do not discard as unsorted waste. Send to separate collection facilities for recovery and recycling

1.5 Text Conventions and Link Types

Explanation	Example
Software controls and GUI elements.	Click **Start**.
Hardware controls and elements.	Press the **Standby** button.
Key on the keyboard.	Press **Enter** on the keyboard.
Press several keys on the keyboard simultaneously.	Press **Ctrl + Alt + Del**.
Follow a path in the software.	Select **Tools > Goto Control Panel > Airlock**.
Text to be entered by the user.	Enter *example.pdf* in this field.
Anything typed in literally during programming, for example macro codes and keywords.	Enter `Integer` in the console.
Link to further information within this document.	See: *Text Conventions and Link Types [▸ 10]*.
Link to a website.	https://www.zeiss.com/corporate/int/home.html

2 Technical Data and Conformity

2.1 Axiocam 212 color

2.1.1 Specifications

Features	Values
Sensor type	CMOS sensor with rolling shutter
Sensor Size / Effective sensor Area	Diagonal 9.3 mm (1/1.7"), Full Sensor Diagonal 8.2 mm (1/2.1"), Ultra HD and Full HD
Effective Sensor Pixel Count	12.3 Megapixels: 4032 (H) x 3044 (V) 8.1 Megapixels: 3840 (H) x 2160 (V) 2.1 Megapixels: 1920 (H) x 1080 (V)
Pixel size	1.85 µm x 1.85 µm (resolution 4032 x 3044 and 3840 x 2160) 3.70 µm x 3.70 µm (binned, resolution 1920 x 1080)
Spectral Sensitivity	Approx. 400 nm – 700 nm, IR filter RGB Bayer color mask
Selectable Resolution	4032 x 3044 (12.3 MP, Full Sensor) 3840 x 2160 (Ultra HD, 4K) 1920 x 1080 (Full HD, 1080p)
Gain (Signal Amplification)	0x – 27x adjustable
Digitization	3 x 8 bit / pixel
Exposure Time Range (Integration time)	0.1 ms - 1 s
Image enhancement functions	Active denoising, active sharpening, auto white balance
Automatic features	Automatic exposure and gain regulation at Ultra HD resolution (4K), fast live image under low light conditions
Status-LED for camera	Color coded operation status
Interfaces	1x HDMI for monitor 1x USB 3.0 Type-C for flash drive, Wi-Fi adapter or PC connection 2x USB 2.0 Type-A for mouse and keyboard 1x RJ45 (Ethernet) for LAN connection 1x M8 for power and communication with dedicated stands
Control buttons	1x Power On/Off switch 1x Camera factory reset button
Wi-Fi compatibility	Via USB Wi-Fi adapter and router

Features	Values
Optical Interface	C-mount
Stand-alone operation: ▪ Image storage format ▪ Video stream format ▪ Live frame rate via HDMI	 ▪ tiff or jpg ▪ mp4 ▪ 30 fps @ Ultra HD (4K)
Maximum live frame rate at configuration: ▪ HDMI ▪ Ethernet ▪ USB 3.0	Full sensor (4032 x 3044) ▪ 30 fps ▪ - ▪ 11 fps
Maximum live frame rate at configuration: ▪ HDMI ▪ Ethernet ▪ USB 3.0	@ 4K (3840 x 2160) ▪ 30 fps ▪ - ▪ 17 fps
Maximum live frame rate at configuration: ▪ HDMI ▪ Ethernet ▪ USB 3.0	@ 1080p (1920 x 1080) ▪ 30 fps ▪ 30 fps ▪ 30 fps
Size/ Weight	Approx. 125 x 92 x 78 mm / 700 g
Housing	Blue painted aluminum and cooling fins
Registration	CE, CSA, UKCA
Power supply	via M8 interface
Power consumption	Max. 36 W (24V DC, 1.5A) Rating of accompanied power adapter: Input: 100 - 240Vac (±10%), 50/60Hz, 1.0A; Output: 24.0Vdc, 1.5A, 36.0W
Environmental conditions for storage and operation	+5 °C to 35 °C, max. 75% relative air humidity at 35°C, no condensation, free air circulation required, CAT II, pollution degree 2, altitude <2000m, indoor use
Environmental conditions for transport in packaging	-40 °C to +70 °C, max. 75 % relative air humidity at 35 °C
IP code	IP20
Operating systems: ▪ for ZEN ▪ for Labscope	 ▪ Windows 10 and 11 x64 and higher ▪ Windows 10 and 11 x64 and iOS v15 and higher, Android 12 and higher
Supported Application Software	ZEN blue v3.11 and higher (includes ZEN lite/ pro/system) ZEN core v3.11 and higher (includes ZEN starter/core)

Features	Values
	Labscope v4.3 (win, iOS, and Android) and higher
TWAIN plugin	Software interface to control camera by 3rd party application software
Order number	426570-9901-000

Info

Computer hardware, operating system, and software may decrease the frame rates. All specifications are subject to change without notice.

Info

The camera is network-enabled and can be used with the ZEISS iOS App, Android APP and ZEISS Labscope software. The Apps are available as a free download from the Apple® App Store, Google Play Store or ZEISS Portal. Unless otherwise stated by the distributor, iPad® and WLAN router are not supplied by ZEISS. Apple®, Apple iPad® are registered trademarks of Apple Inc.

2.1.2 Spectral Sensitivity

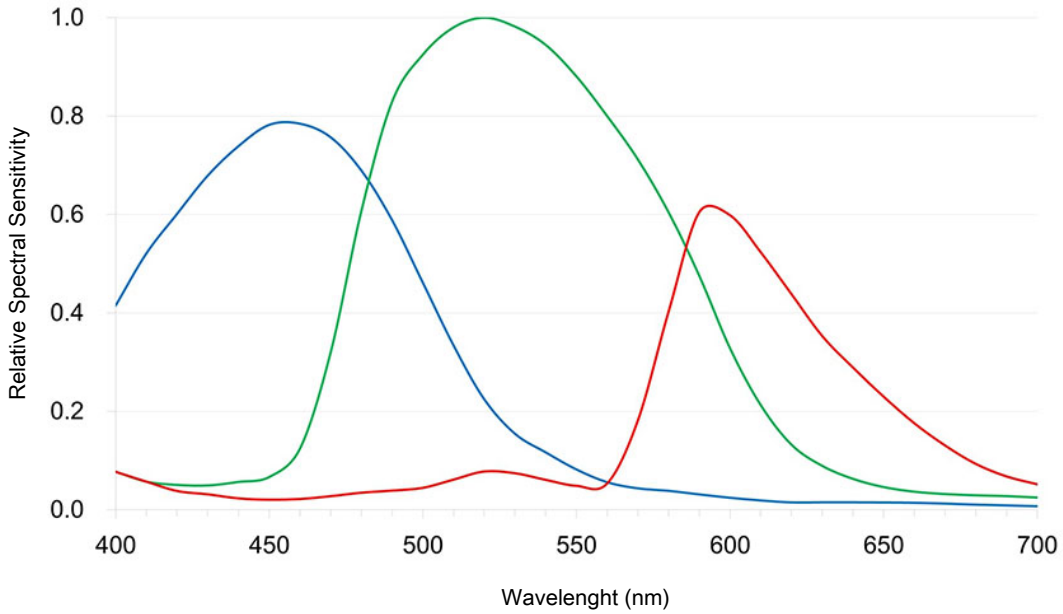


Fig. 2: Spectral Sensitivity of Axiocam 212 color (incl. IR Filter)

2.2 Axiocam 203 mono

2.2.1 Specifications

Features	Values
Sensor Type	CMOS sensor with rolling shutter
Sensor Size / Effective Sensor Area	Diagonal 9.2 mm (1/1.7"), Full Sensor Diagonal 8.2 mm (1/2.1"), Full HD

Features	Values
Effective Sensor Pixel Count	3.0 Megapixels: 1984 (H) x 1522 (V) 2.1 Megapixels: 1920 (H) x 1080 (V)
Pixel size	3.7 µm
Spectral Sensitivity	Approx. 350 nm – 850 nm, protection glass (coated)
Selectable Resolution	1984 x 1522 3 MP, Full Resolution 1920 x 1080 (Full HD)
Gain (Signal Amplification)	0x – 27x adjustable
Digitization	12 bit or 8 bit / pixel
Cooling	Passive cooling
Exposure Time Range (Integration time)	0.1 ms - 2 s
Image enhancement functions	Active denoising, active sharpening
Automatic features	Automatic exposure and gain regulation at Full HD resolution (1080p), fast live image under low light conditions
Status-LED for camera	color coded operation status
Interfaces	1x HDMI for monitor 1x USB 3.0 Type-C for flash drive, Wi-Fi adapter or PC connection 2x USB 2.0 Type-A for mouse and keyboard 1x RJ45 (Ethernet) for LAN connection 1x M8 for power and communication with dedicated stands
Wi-Fi compatibility	Via USB Wi-Fi adapter and router
Optical Interface	C-mount
Camera control buttons	1x Power On/Off switch 1x Camera factory reset
Stand-alone operation: ▪ Image storage format ▪ Video stream format ▪ Live frame rate via HDMI	 ▪ tiff or jpg ▪ mp4 ▪ 30 fps @ Full HD (1080p)
Maximum live frame rate at configuration: ▪ HDMI ▪ Ethernet ▪ USB 3.0	Full sensor (1984 x 1522) ▪ 30 fps ▪ - ▪ 30 fps
Maximum live frame rate at configuration: ▪ HDMI ▪ Ethernet ▪ USB 3.0	@ 1080p (1920 x 1080) ▪ 30 fps ▪ 30 fps ▪ 30 fps

Features	Values
Size/Weight	Approx. 125 x 92 x 78 mm / 700 g
Housing	Blue painted aluminum and cooling fins
Registration	CE, CSA, UKCA
Power supply	via M8 interface
Power consumption	Max. 36 W (24 V DC, 1.5 A) Rating of accompanied power adapter: Input: 100 - 240Vac (±10%), 50/60Hz, 1.0A; Output: 24.0Vdc, 1.5A, 36.0W
Environmental conditions for storage and operation	+5°C to 35°C, max. 75% relative air humidity at 35°C, no condensation, free air circulation required, CAT II, pollution degree 2, altitude <2000m, indoor use
Environmental conditions for transport in packaging	-40 °C to +70 °C, max. 75 % relative air humidity at 35 °C
IP code	IP20
Operating systems: ▪ for ZEN ▪ for Labscope	 ▪ Windows 10 and 11 x64 and higher ▪ Windows 10 and 11 x64 and iOS v15 and higher, Android 12 and higher
Supported Application Software	ZEN blue v3.11 and higher (includes ZEN lite/pro/system) ZEN core v3.11 and higher (includes ZEN starter/core) Labscope v4.3 (win, iOS, and Android) and higher
TWAIN plugin	Software interface to control camera by 3rd party application software
Order number	426570-9910-000

Info

Computer hardware, operating system, and software may decrease the frame rates. All specifications are subject to change without notice.

2.2.2 Spectral Sensitivity

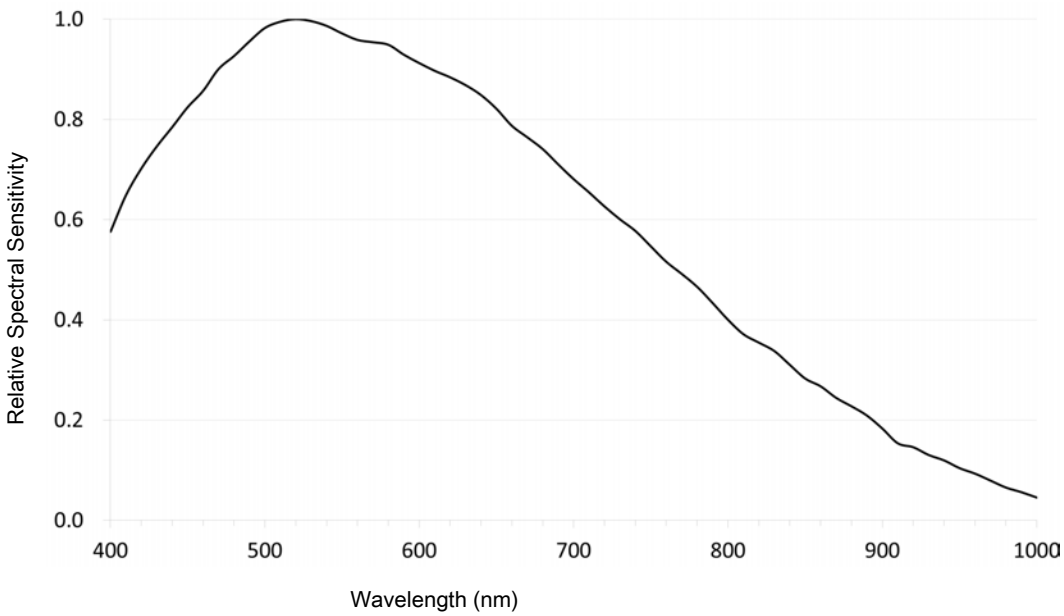


Fig. 3: Relative Spectral Sensitivity of Axiocam 203 mono

2.3 Applicable Standards and Regulations

Observe the generally applicable local and national safety and accident prevention regulations, as well as the applicable laws and regulations in your country. The camera and its accessories have been designed, manufactured and tested to comply with the guidelines and specifications as named in the following. The accordance to the relevant specification is indicated by a respective symbol on the unit.

2.3.1 Symbols on the camera

Symbol	Description
CE	Conforms to: ▪ EU Directive 2014/35/EU (LVD) ▪ 2014/30/EU (EMC) ▪ 2015/863/EU (RoHS)
C US 265366	CSA certificate mark, conforms to: ▪ CAN/CSA-C22.2 No. 61010-1-12 ▪ UL Std. No. 61010-1 (3rd edition)
	Complies with EU Directive 2012/19/EU (WEEE)

Tab. 2: List of attached labels concerning standards and regulations

3 Shipment

3.1 Axiocam 212 color

- 1x Axiocam 212 color
- 1x Power & Data Y-cable with power adapter (incl. country-specific plug) and interface to connect to microscope stand (compatible with Axiolab 5 and Axioscope 5/7)
- 1x USB 3.0 cable, Type-C to Type-A
- 1x USB 3.0 flash drive, Type-C and Type-A

Accessories for Stand-Alone and for Usage with Labscope

Order Number	Accessory
000000-0626-248	High-Speed-HDMI-Cable, Premium, Resolution 4K, 2m
000000-0626-246	Optical USB-Scroll Mouse
000000-0626-267	Keyboard, USB, Language US
426570-9210-000	Wi-Fi dongle package containing Wi-Fi Dongle (Dual band 2.4GHz and 5GHz) and USB adaptor Type-C to Type-A

3.2 Axiocam 203 mono

- 1x Axiocam 203 mono
- 1x Power & Data Y-cable with power adapter (incl. country-specific plug), camera to microscope stand (compatible with Axiolab 5 and Axioscope 5/7)
- 1x USB 3.0 cable, Type-C to Type-A
- 1x USB 3.0 flash drive, Type-C and Type-A

Accessories for Stand-Alone and for Usage with Labscope

Order Number	Accessory
000000-0626-248	High-Speed-HDMI-Cable, Premium, Resolution 4K, 2m
000000-0626-246	Optical USB-Scroll Mouse
000000-0626-267	Keyboard, USB, Language US
426570-9210-000	Wi-Fi dongle package containing Wi-Fi Dongle (Dual band 2.4GHz and 5GHz) and USB adaptor Type-C to Type-A

4 Connecting the Camera

4.1 Camera Layout and Accessories

4.1.1 Camera Connections

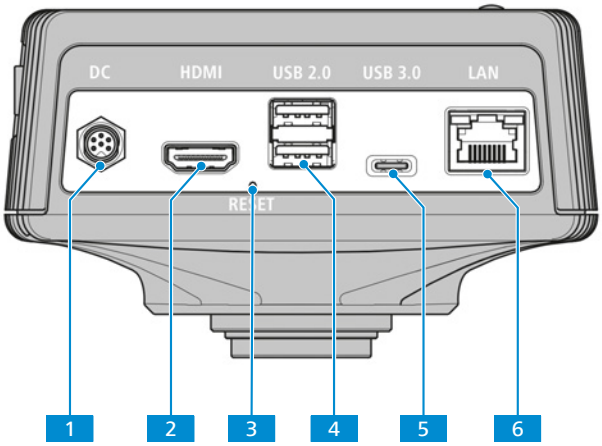


Fig. 4: Camera connector panel

1 **M8 port**

Power supply (24 V DC, 1.5 A) and communication

2 **HDMI port**

Image data transfer to a certified monitor; TV or projector

3 **Camera factory reset**

Resets the camera to the factory settings

4 **2x USB 2.0 Type-A**

OSD control mouse and keyboard

5 **1x USB 3.0 Type-C**

Camera control and image data transfer

6 **RJ45 port (Ethernet)**

Communication and image data transfer

4.1.2 Camera Controls

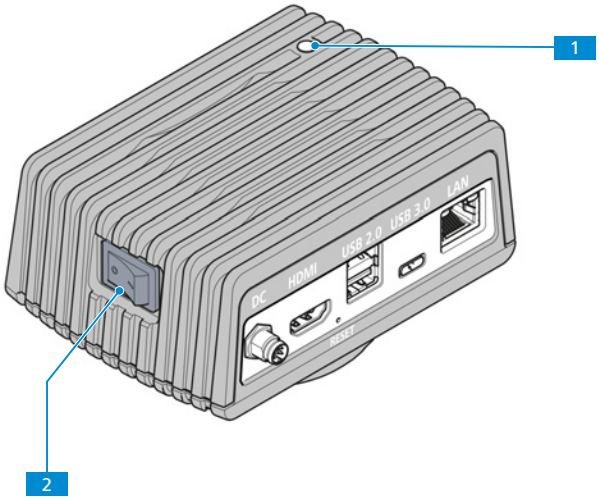


Fig. 5: Camera operator panel

1 **LED function indicator**

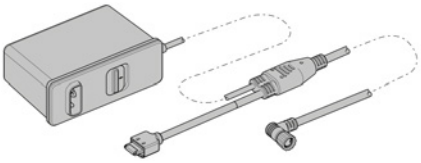
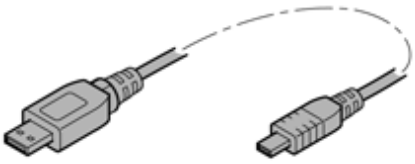
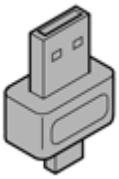
See *Function indicator signals [▸ 26]* for detail.

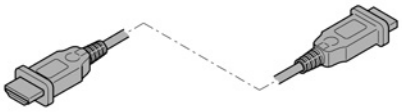
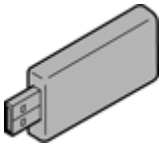
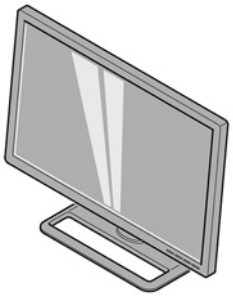
2 **Power ON / Off switch**

Turns the camera on or off.

4.1.3 Accessories

The following items are required for power supply and use of the ports:

Name	Figure	Remarks
Power supply with country specific plugs and attached Y-cable		Power supply and M8 power cable to power the camera and connection cable between camera and compatible microscopes (e.g. Axioscope 5/7 or Axiolab 5)
USB 3.0 cable, Type-C to Type-A		Connection between camera and PC
USB flash drive, Type C and Type A		Connection to camera (Type-C) or to USB hub (Type-A) for immediate image and video storage
Ethernet cable (not supplied in package)		Connection between camera and network or WLAN router

Name	Figure	Remarks
HDMI cable (not supplied in package, order separately: Order No. 000000-0626-248)		Connection between camera and monitor, TV, or projector
Mouse (not supplied in package, order separately: Order No. 000000-0626-246)		For control and navigation in the **OSD** menu
Keyboard (not supplied in package, order separately: Order No. 000000-0626-267 for US layout)		For typing in the **OSD** menu
Wi-Fi Adapter package (not supplied in package, order separately: Order No. 426570-9210-000)		Wi-Fi Adapter package consisting of Wi-Fi adapter (Dual band 2.4GHz and 5GHz) and USB adapter Type-C to Type-A for wireless transmission of camera images to PC or iPad with Labscope
Monitor TFT 32" 4K (not supplied in package, order separately: Order No. 410350-3204-000)		For display of camera image and operating the OSD menu

4.2 Mounting the Camera to the Microscope

To mount the camera to your microscope's camera port, use a C-mount camera adapter. The adapter is not included in the scope of delivery. You will find some suitable examples for adapters in the list below:

Info

Damage during storage or transportation

It is recommended to keep the original packing and store it away for later use, e.g. for stowing the microscope camera during periods of non-use or for returning it to the manufacturer for repair.

Camera	Port	Adapter	Order number
Axiocam 212 color	60N	Camera Adapter 60N-C 2/3" 0.5x	426112-0000-000

Camera	Port	Adapter	Order number
Axiocam 203 mono	60N	Camera Adapter 60N-C 2/3" 0.5x	426112-0000-000

NOTICE

Loss of warranty

The Axiocam 212 color is delivered with an integrated IR filter (infrared cut filter). The Axiocam 203 mono is delivered with a protective glass to shield the camera against dust and to reduce optical interferences.

- Do not remove the filter or the protective glass. Otherwise the warranty will be lost.

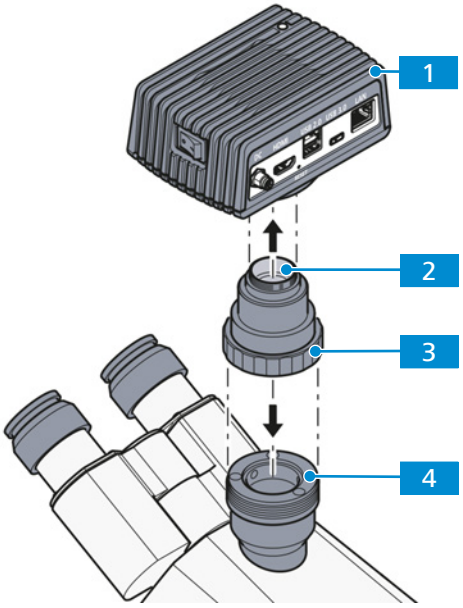


Fig. 6: Mounting the camera to the microscope

1	Camera
2	C-mount camera adapter
3	Ring nut
4	60N port at microscope stand

Procedure

1. Remove the dust cap from the camera's C-mount port.
2. Mount the C-mount camera adapter to the camera.
3. Attach the camera with the adapter to the microscope's 60N port.
4. Orient the camera to the stand and fix its position by tightening the ring nut.

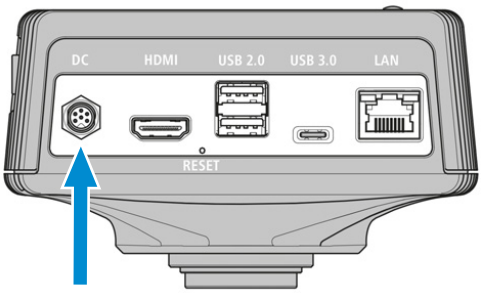
4.3 Connecting the Camera to the Power Supply

Prerequisite

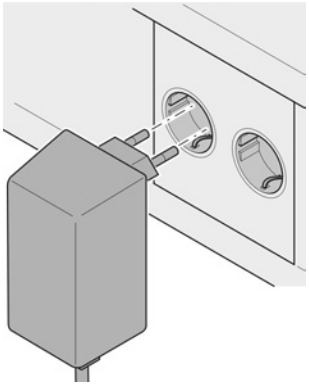
✓ The power supply has been equipped with the appropriate country-specific adapter.

Procedure

1. Insert the M8 plug of the Y-cable into the M8 port of the camera.



2. Insert the power adapter into a power outlet.



3. Turn on the camera via **ON-/Off** switch.

4.4 Connecting the Camera to Axioscope 5/7 and Axiolab 5

Prerequisite

- ✓ The camera is mounted to Axioscope 5/7 or Axiolab 5.
- ✓ The M8 plug of Y-cable has been plugged into M8 port of the camera.
- ✓ The power supply has been plugged into a power outlet.

Procedure

1. Insert the remaining end of the Y-cable into the corresponding socket on your microscope.
2. Turn on the camera via **ON-/Off** switch.

Info

Refer to the instruction manual of your microscope for further information.

4.5 Connecting the Camera to a Display (without PC)

The camera can be connected to a certified HDMI monitor, TV, or projector for visualization of the live image data and for operating the OSD menu functions. Certain HDMI functions (e.g. audio, commands from monitor to camera) are not supported.

Info

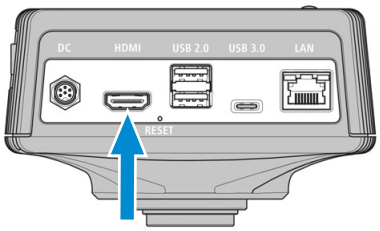
If you connect the Axiocam 212 color / 203 mono to a monitor, these are the minimal monitor requirements:

- HDMI 1.4 or HDMI 2.0 input port
- 1920 x 1080 or higher resolution
- 16:9 aspect ratio
- Progressive scanning
- HDMI cable with less than 3 m length (shorter cable enables better signal integrity)
- The HDMI monitor is switched on
- HDMI cable is connected to HDMI monitor

Note that the maximum live image resolution of the Axiocam 203 mono is Full HD (1920 x 1080), while the Axiocam 212 color supports live image resolution of up to Ultra HD (4K).

Procedure

1. Insert the HDMI cable into the HDMI port of the camera.



2. Insert the HDMI cable's opposite connector into the corresponding socket on your display device.
3. Set the display device's aspect ratio to 16:9 or Aspect.

For further camera settings using the **OSD** a mouse is required and a keyboard is recommended.

4.6 Connecting the Camera to a Network

If you want to connect the camera to a network, you can choose between several options, of which all require network access and the ZEISS imaging software Labscope (available as windows, iOS or Android version). The camera identifies itself automatically to the network (DHCP) and is automatically recognized by Labscope, provided the device is on the same network.

NOTICE

Display errors

In the event of an overloaded or slow WLAN, the live image of the camera may be delayed or incorrectly displayed on the iPad.

- If possible, use a high-performance 802.11n WLAN.
- Provide a sufficient contingent of free bandwith for communication.

For an overview of all ZEISS Microscopy apps and further information on individual apps, visit https://www.zeiss.com/microscopy/int/products/microscope-software/microscopy-apps.html?vaURL=www.zeiss.com/micro-apps

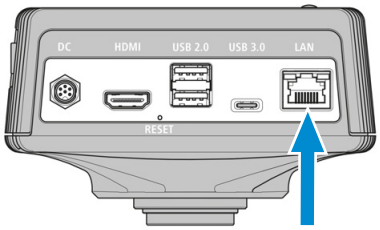
4.6.1 Connecting Camera via Ethernet

Prerequisite

✓ The camera is powered via mains supply.

Procedure

1. Insert the Ethernet cable into the camera's Ethernet port.



2. Insert the Ethernet cable's opposite connector into the corresponding socket on your WLAN router or the Ethernet port of a windows PC / Laptop.

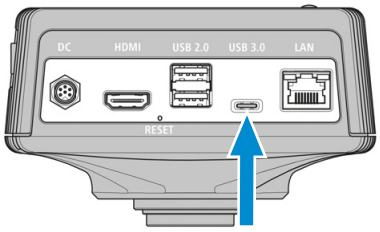
4.6.2 Connecting Camera via Wi-Fi Adapter

Prerequisite

- ✓ The camera is powered via mains supply.
- ✓ An USB Wi-Fi adapter is available.
- ✓ An USB mouse is connected to the camera to operate the OSD.
- ✓ The camera is connected to a display via HDMI.

Procedure

1. Insert the USB Wi-Fi adapter into the camera's USB Type-C port.



2. Open On Screen Display menu by moving the USB mouse.
3. Select **Global Settings** icon in Home Menu (see *Live View Menu [▸ 27]*) to open the **Global Settings** menu.
4. Select **Wi-Fi Options tab**.

↳ The Wi-Fi options tab offers two ways to connect the camera to a Wi-Fi device (e.g. iPad or Laptop) (see *Wi-Fi Options Tab [▸ 45]*).

See also

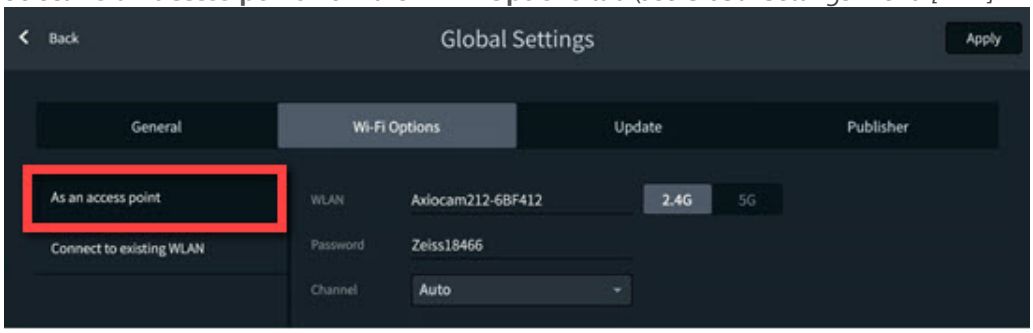
Operating the Camera via OSD Menu [▸ 27]

4.6.2.1 Using the Camera as Access Point

Follow the subsequent instructions to directly connect your camera to the Wi-Fi device:

Procedure

1. Select **As an access point** from the **Wi-Fi Options** tab (see *Global Settings Menu [▸ 41]*.



2. Type in the network name (or keep default name) and password **ZEISS1846** into the respective input fields.

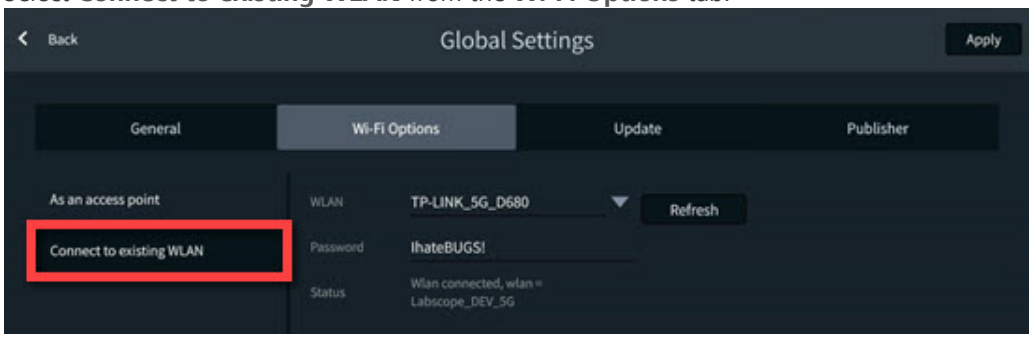
→ The camera can be found by other devices as access point: Other devices can connect to the camera using the specified network name and password.

4.6.2.2 Connecting to Existing WLAN

Follow the subsequent instructions to connect your camera to an existing WLAN:

Procedure

1. Select **Connect to existing WLAN** from the **Wi-Fi Options** tab.



2. Select the network name from the respective selection field.
3. Type in the password into the respective input field.
   → The camera is connected to the WLAN.
   → If the Wi-Fi device is connected to the same router, the camera appears in Labscope.

Info

If the WLAN list is empty or does not contain the one you want to connect to, wait for a few seconds and click again to refresh.

Info

No country specific special characters are supported for a password.

Allowed: A~Z a~z 0~9 @ # % * . ! , ; ? / \ & ( ) ‘’ ` - : , - + ~$ < >

The password must be 8-32 characters long.

4.7 Connecting the Camera to a Certified PC

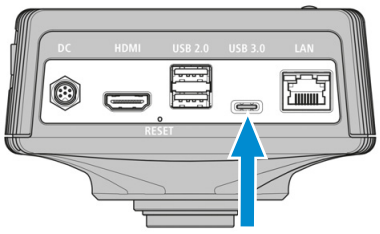
4.7.1 USB port

The USB port Type-C can also be used to connect the camera with a windows PC or Laptop to operate the camera via windows software Labscope or ZEN.

Prerequisite ✓ The camera is powered via mains supply or microscope.

Procedure

1. Insert the USB 3.0 cable's Type-C connector into the corresponding socket on the camera.



2. Insert the USB 3.0 cable's Type-A connector into the corresponding socket on the PC.

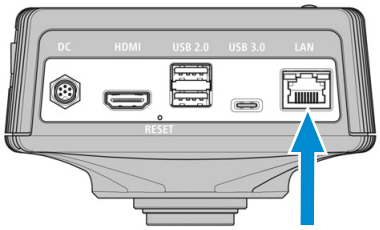
4.7.2 Ethernet

By network cable, the camera can be connected directly to a windows PC or Laptop.

Prerequisite ✓ If the camera is directly connected to a windows PC or Laptop with a network cable, the camera will have a fixed link local IPV4 address: 169.254.203.212

Procedure

1. Insert the network cable's RJ45 Ethernet-Stecker to the RJ45 socket of the camera.



2. Insert the other end of the network cable's RJ45 Ethernet-Stecker into the corresponding socket on the PC.

4.8 Function indicator signals

For the definitions of the LED color signals, refer to the list below:

Signal	Description
Green	Camera starting
Blue	Power supplied and camera ready
Blue flash	Snapping/recording in process, and saving data to USB flash drive
Red flash	Firmware updating/factory resetting
Pink flash	No USB flash drive or the drive is full
Off	No power supplied

5 On Screen Display (OSD)

Info

Certain functions of the OSD menu are only available with compatible microscope stands i.e. Axioscope 5/7 or Axiolab 5. For more information, refer to the relevant microscope's manual.

5.1 Operating the Camera via OSD Menu

To operate the camera via OSD, plug your USB mouse and keyboard into USB 2.0 Type-A port and USB flash drive (included in the package) into the USB 3.0 Type-C port on the rear side of the camera..

Prerequisite

- ✓ The camera is powered via mains supply.
- ✓ The camera is connected to a display via HDMI.
- ✓ The camera is connected to a USB mouse.

Procedure

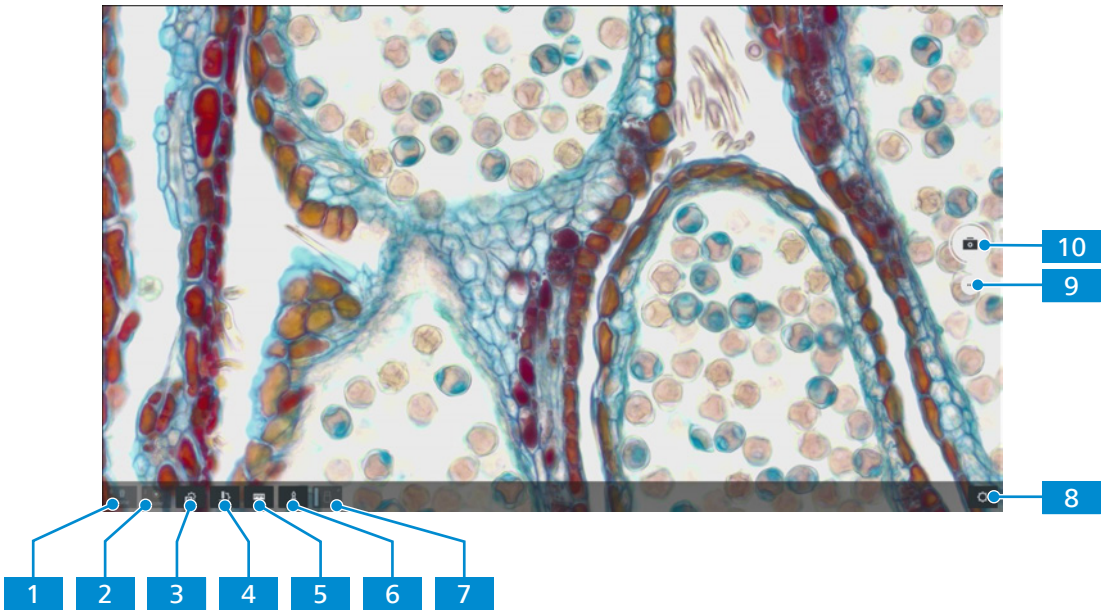
1. To open the **Live View** Menu of the OSD, move the mouse over the live image on the screen.
   → If you stop to move the mouse the OSD will close after approx. 5 sec.

Info

A USB flash drive used should be of FAT32 format and have enough free space for storing the data.

5.2 Live View Menu

The **Live View** menu gives you basic imaging controls to capture your images with minimal effort.



No.	Parameter	Description
1	**Objective** icon	The currently used objective is displayed (only for configured dedicated stands e.g. Axioscope 5/7 or Axiolab 5).

No.	Parameter	Description
2	**Reflector** icon	The currently used reflector is displayed (only for configured dedicated stands e.g. Axioscope 5/7 or Axiolab 5).
3	**Acquisition settings** icon	Opens the acquisition settings menu, see *Acquisition Settings Menu [▸ 31]*.
4	**Microscope configuration** icon	Opens the microscope configuration menu, see *Configure Microscope Menu [▸ 37]*.
5	**Scale bar** icon	Allows to add a scale bar to the image.
6	**Annotations** icon	Allows to add annotations to the image, see *Annotations Menu [▸ 36]*.
7	**USB stick** icon	Shows if a USB stick is connected. Provides eject button to safely remove the USB stick. It is highly recommended to use this eject function before unplugging the USB stick to keep data integrity.
8	**Global settings** icon	Opens the global settings menu, see *Global Settings Menu [▸ 41]*.
9	**Change acquisition mode** icon	Select the desired acquisition mode, see *Acquisition Modes [▸ 31]*.
10	**Snap** button	Snaps a single image. Depending on the selected acquisition mode different types of acquisition can be performed.

5.2.1 Acquiring a Single Image

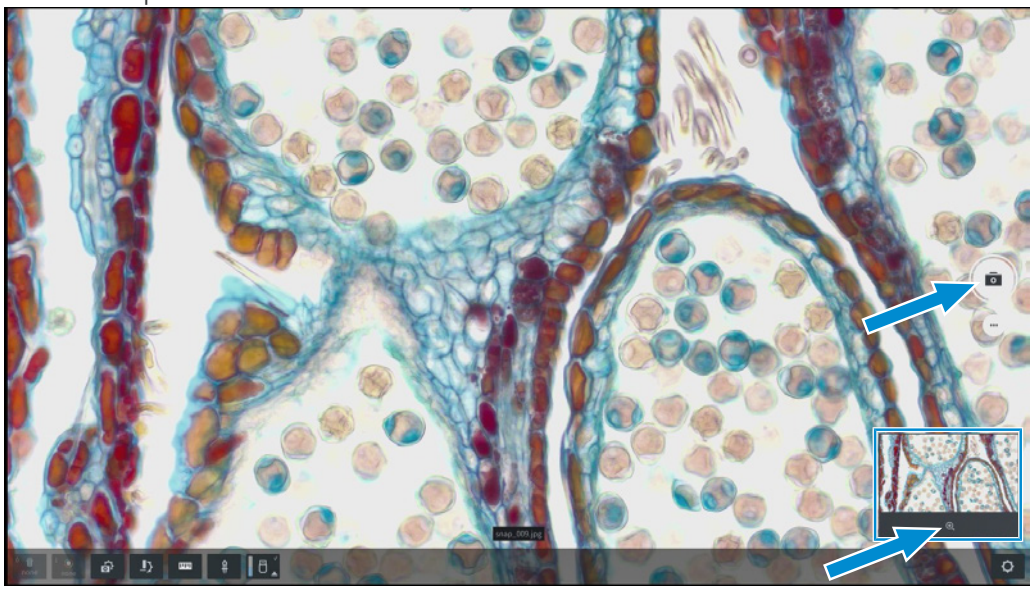
Prerequisite

✓ The microscope is operational.

✓ The Single Image (Snap) acquisition mode is active.

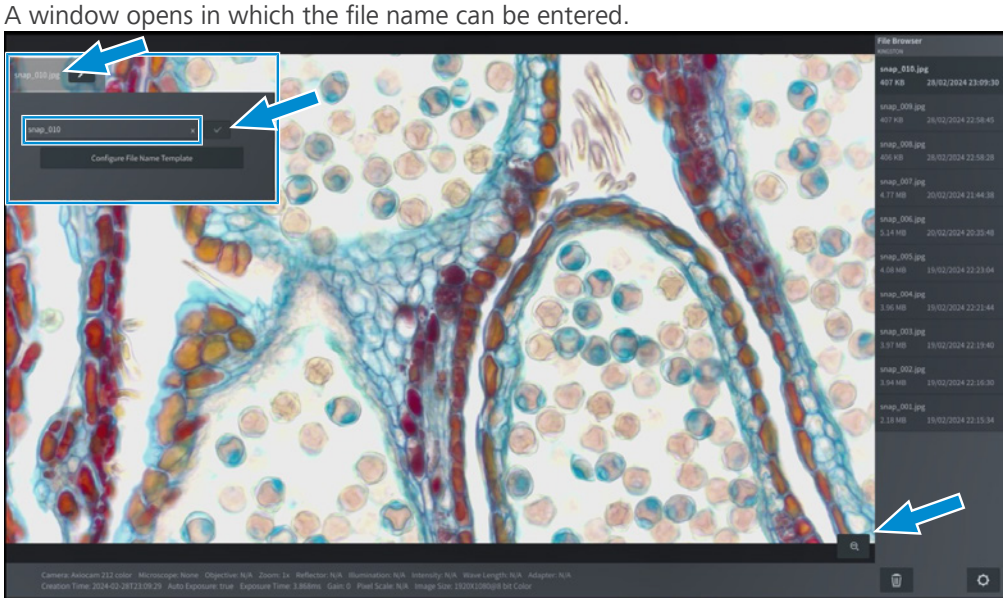
Procedure

1. Click on the **Snap** button .
   → A single image is captured and a preview is displayed on the bottom right side of the screen.
2. Click on the preview.



→ The image opens and is displayed enlarged.

3. Click on the image name.
   → A window opens in which the file name can be entered.



4. Enter a new name for the image.
5. Click on the button  to save the changes.
6. To close the window, click on the minus sign  .

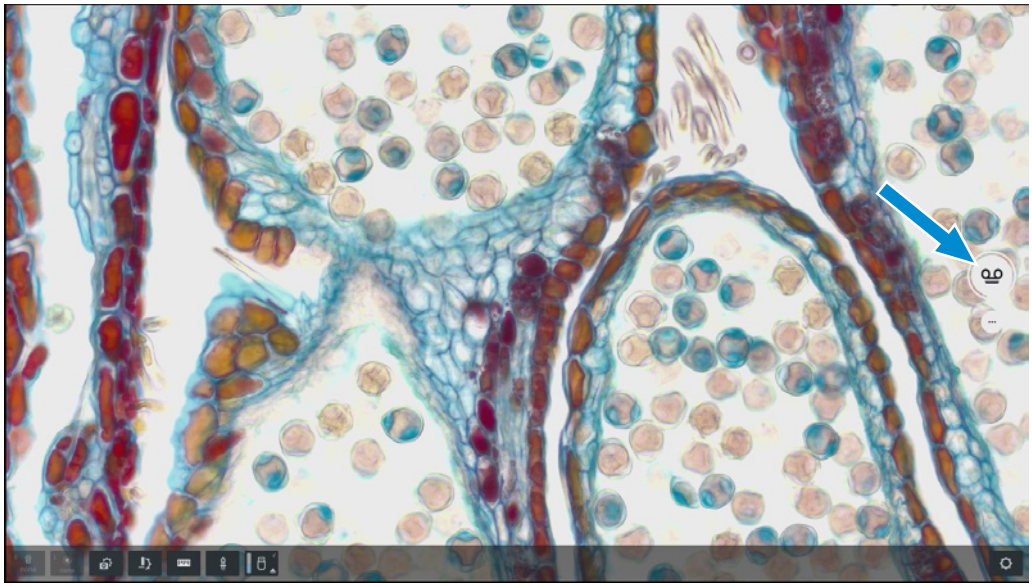
Info

The **Configure File Name Template button** opens another template in which presettings for naming the files can be made.

5.2.2 Recording a Video

Prerequisite
- ✓ The microscope is operational.
- ✓ The Video Recording acquisition mode is active.

Procedure
1. Click on the **Video** button.



→ The video recording starts.

→ The button changes to

2. Click on

→ The video recording stops.

→ The thumbnail of recorded video is displayed on the bottom right corner of the screen.

5.2.3 Acquiring Multi-Channel Images

Prerequisite

✓ The microscope stand is operational.

✓ The Multi-Channel acquisition mode is active. 

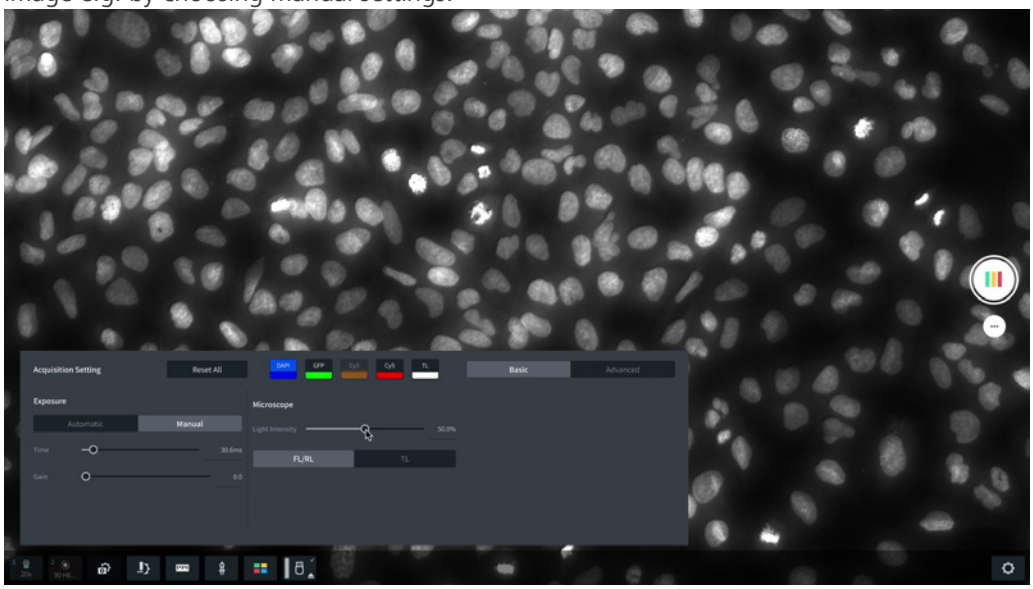
✓ The desired fluorescence channels are selected (button turns black) or deselected (button turns grey) by right mouse click on.

Procedure

1. Click (left mouse) on the selected fluorescent channel button to switch on fluorescent LED and start camera live view (in Live View or acquisition settings).

   → A live image is displayed on the screen.

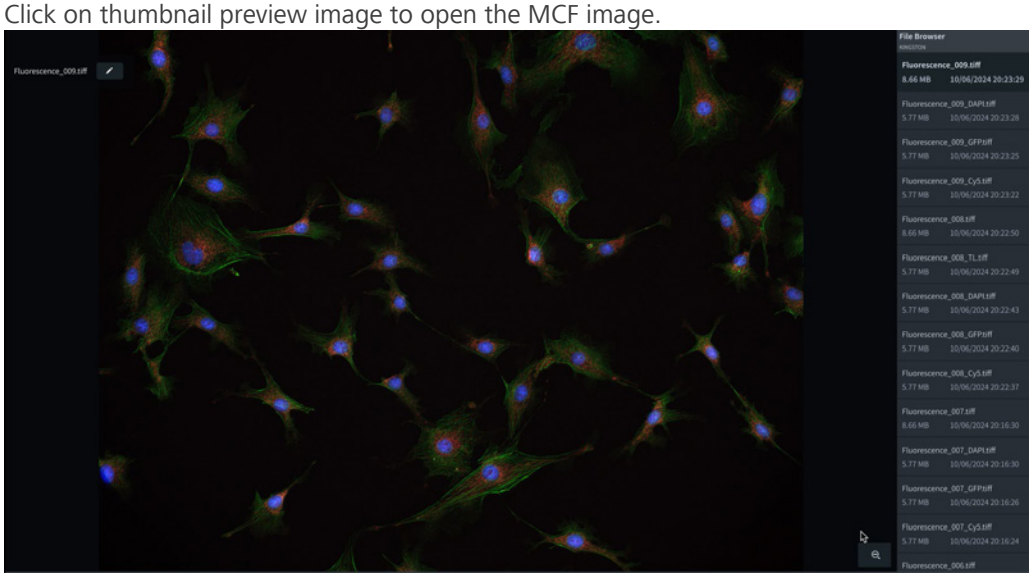
2. If desired, optimize acquisition settings like exposure time gain manually to optimize your image e.g. by choosing manual settings.



3. Repeat the procedure for all channels you want to use for the MCF image acquisition. Channels without pseudo color assignment are not taken into account in the MCF recording. For configuration of fluorescent channels, see *General Tab [▶ 42]*.
4. Click on Multi-Channel button.

   → The multi-channel image is saved, and a thumbnail of the image is displayed.

5. Click on thumbnail preview image to open the MCF image.



6. By click on image name in left top corner a window opens to change the file name.
7. In file browser at the right side the single fluorescence channel images are listed and can be opened (by click).

5.3 Acquisition Modes

The following acquisition modes are available:

Icon	Mode
	Single image acquisition (Snap)
	Video recording
	Multi-channel acquisition

5.3.1 Acquisition Settings Menu

Based on the camera type and the microscope stand, the content of the **Acquisition Settings** menu may vary. The **Acquisition Settings** menu contains two layers, which can be selected by clicking the corresponding tab:

- **Basic**
- **Advanced**

5.3.2 Acquisition Settings Menu - Basic

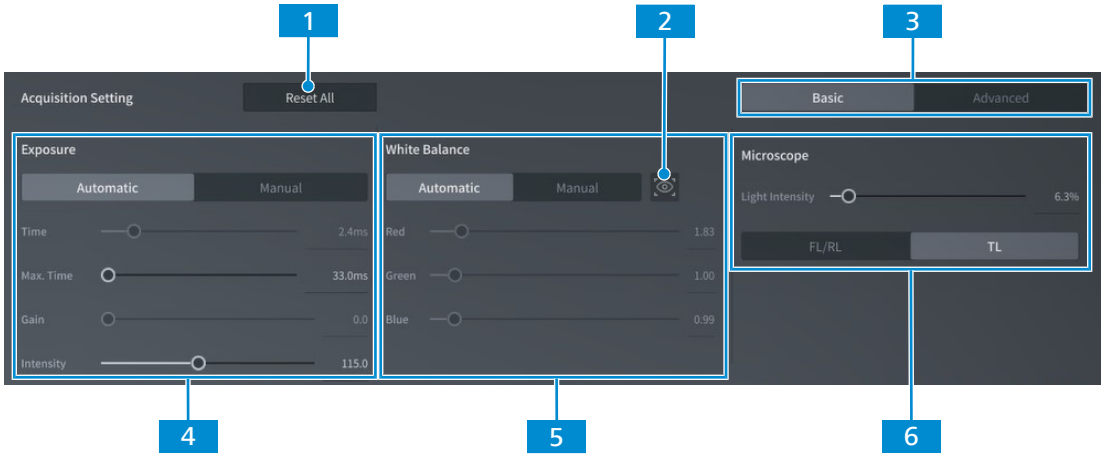


*Fig. 7: **Acquisition Settings** menu - Basic*

No.	Parameter	Description
1	**Reset all** button	Restore the default acquisition settings.
2	**Preset**	preset the white balance of microscope, according to LED power.
3	**Basic** tab	Open the **Basic** layer.
4	**Exposure** controls	See *Setting the Exposure [▸ 33]*.
5	**White balance** controls	See *Setting the White Balance Manually [▸ 34]*.
6	**Microscope** controls	See *Setting the Light Intensity [▸ 34]*.

5.3.3 Acquisition Settings Menu - Advanced

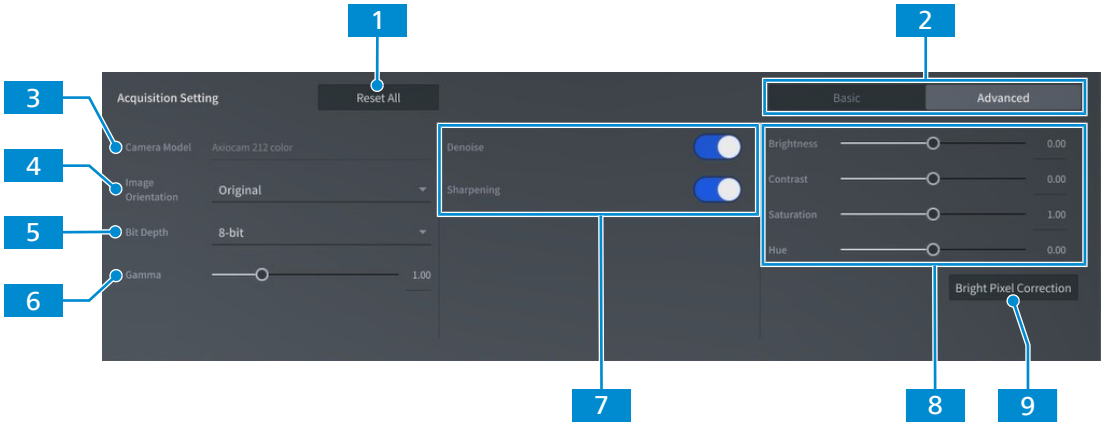


*Fig. 8: **Acquisition Settings** menu - Advanced*

No.	Parameter	Description
1	**Reset all** button	Restore the default acquisition settings.

No.	Parameter	Description
2	**Advanced** tab	Open the **Advanced** layer.
3	**Camera model** display field	Displays the camera model.
4	**Image orientation** drop down list	Adjust the image orientation.
5	**Bit depth** drop down list	Select the bit depth.
6	**Gamma** slider	Adjust the gamma settings.
7	Image enhancement settings	Activate/deactivate automatic denoise or sharpening.
8	Image optimization settings	Adjustments for the image optimization.
9	**Bright Pixel Correction** button	Opens the bright pixel correction setup, see *Bright Pixel Correction [▸ 34]*.

5.3.4 Setting the Exposure

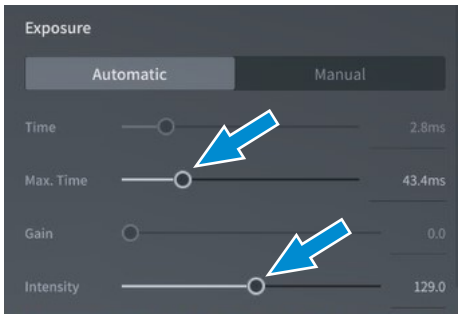
Automatically setting the exposure

The automatic exposure setting mode ensures a consistent brightness of the image by continuously calculating the correct exposure time based on the current light intensity.

Procedure

1. At the OSD menu, navigate to the **Acquisition Settings** menu.
2. At the **Exposure** controls, click the **Automatic** button.

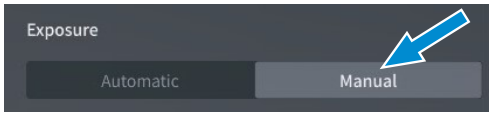
3. If necessary, fine-tune the exposure **Max. Time / Intensity** using the respective **slider** or the input field.



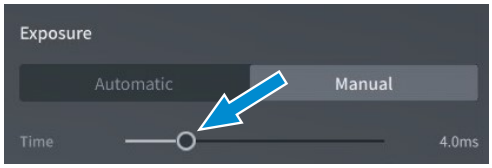
Manually setting the exposure

Procedure

1. At the OSD menu, navigate to the **Acquisition Settings** menu.
2. At the **Exposure** controls, click the **Manual** button.



3. Set the exposure **Time** using the respective **slider** or the input field.

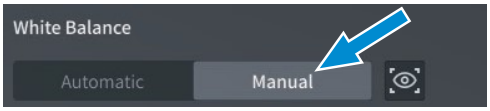


4. Set the **Gain** value using the respective **slider** or input field.

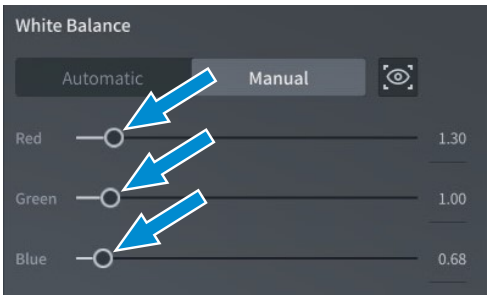
5.3.5 Setting the White Balance Manually

Procedure

1. At the OSD menu, navigate to the **Acquisition Settings** menu.
2. At the **White balance** controls, click the **Manual** button.



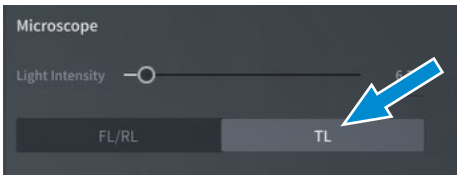
3. If necessary, fine-tune the white balance using the **RGB sliders**.



5.3.6 Setting the Light Intensity

Procedure

1. At the OSD menu, navigate to the **Acquisition Settings** menu.
2. At the **Light intensity** controls, tap the **TL** button, if a TL light source is installed.



3. If necessary, fine-tune the **Light Intensity** for the TL light source using the respective **slider** or the input field.

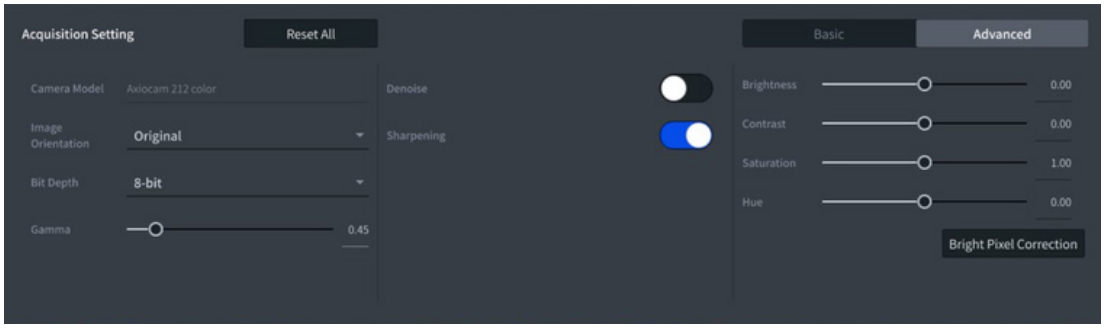
4. Tap the **FL/RL** button, if a RL or FL light source is installed.

5. If necessary, fine-tune the **Light Intensity** for the RL light source using the respective **slider** or the input field.

5.3.7 Bright Pixel Correction

The **Bright Pixel Correction** setup allows you to apply the Bright Pixel Correction procedure. This procedure corrects newly developed bright (or hot) pixels due to long exposure times, high gain settings or cosmic events.

Open the Bright Pixel Correction setup by click on respective button in Acquisition menu under Advanced:

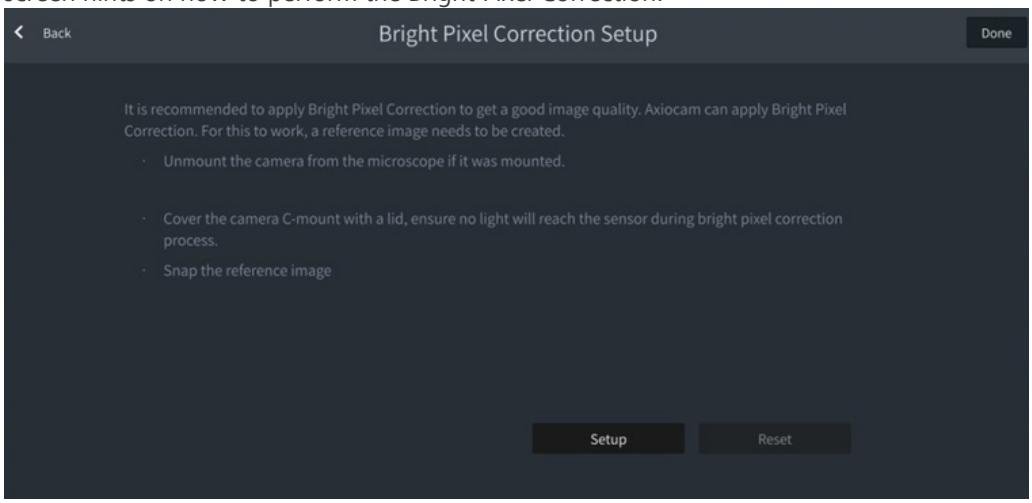


Prerequisite

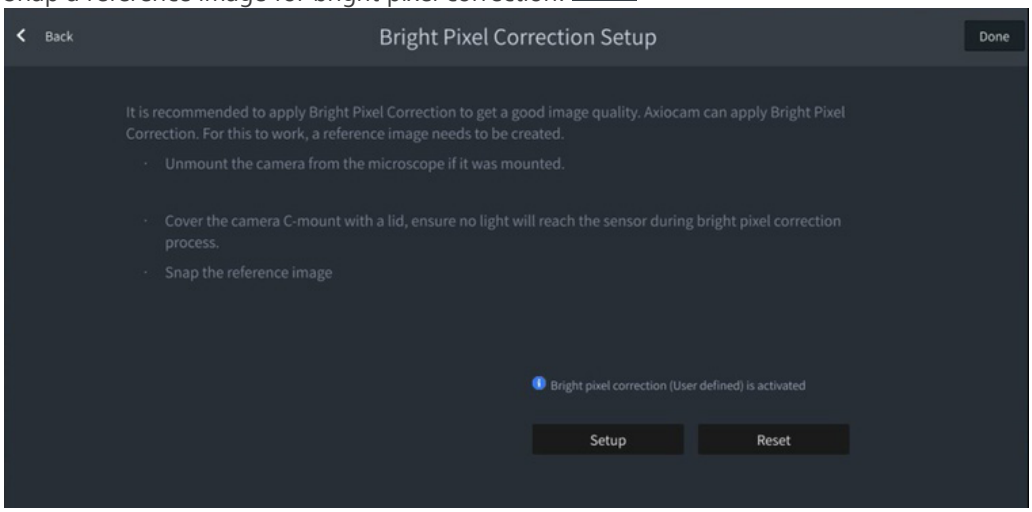
✓ The C-mount port is closed so that no light will reach the image sensor during the procedure. You can close the C-mount port by either closing the light path of the microscope stand or detaching the camera from the stand and protect sensor from light by screwing the protective cap onto the camera's C-mount thread.

Procedure

1. Click on **Setup** button in Bright Pixel Correction Setup menu. Read and observe the on-screen hints on how to perform the Bright Pixel Correction.



2. Snap a reference image for bright pixel correction. 



3. Close Bright Pixel Correction Setup by click on **Done** button.

5.4 Annotations Menu

You can add measurements, markers or text annotations to an image in live view. The annotations can be customized with the available colors – red, blue, green, yellow, black and various line thicknesses and font sizes. Below you can find the list of the available annotations and measurement tools.

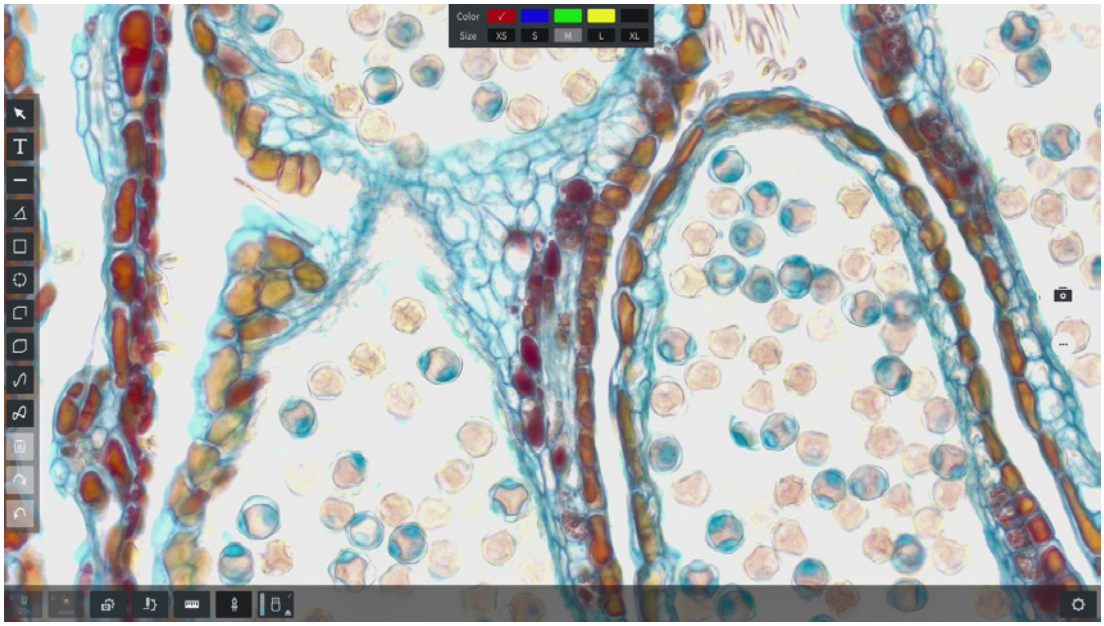


*Fig. 9: **Annotations** Menu*

Parameter	Description
Arrow	Allows to select several annotations by drawing a rectangle over the screen.
Text	Allows to enter text in a box.
Distance	Draws a line and measures the length.
Angle	Allows to measure an angle.
Rectangle	Draws a rectangle and measures area.
Circle	Draws a circle and measures the area.
Polyline	Draws a polyline and measures the distance.

Parameter	Description
Polygon 	Draws a polygon and measures the area.
Spline 	Draws a spline and measures the distance.
Spline Contour 	Draws a spline contour and measures the area.
Remove 	Removes the selected annotation. If several annotations are selected with the selection arrow, they can be deleted at once. Also, press Ctr+A on keyboard will delete all selected annotations.
Redo 	Redo the previous change.
Undo 	Undo the last change.

Info

For measuring, ensure a correct configuration of camera adapter, objectives and filter sets in accord to the actual components on your microscope. And in the live view, always check and confirm the current selected objective magnification in OSD microscope configuration is identical as the current objective on the nosepiece.

5.5 Configure Microscope Menu

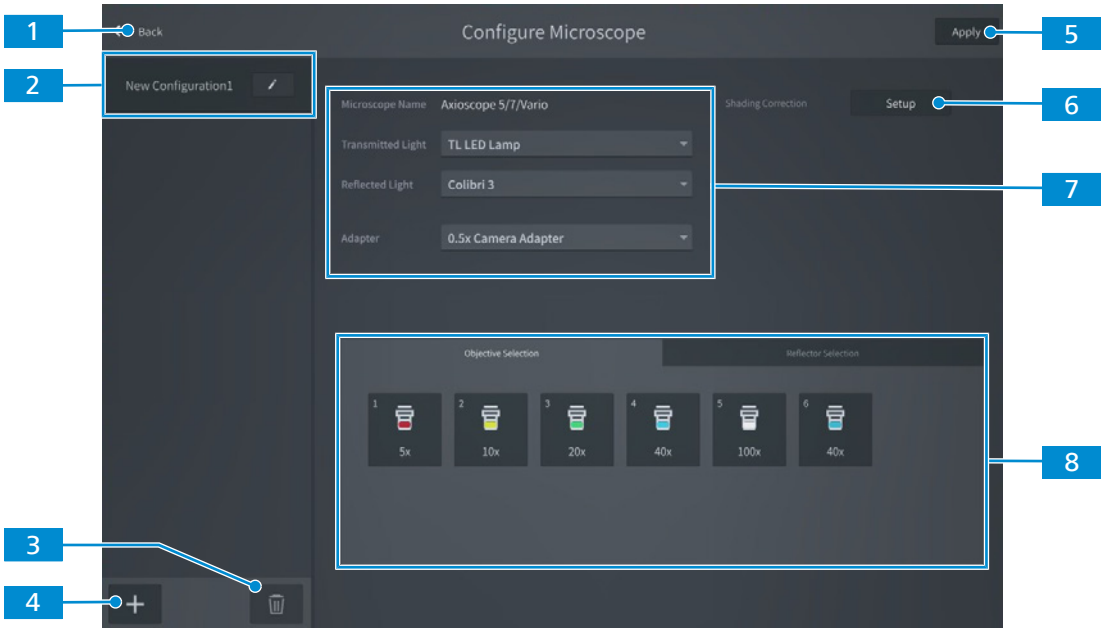


*Fig. 10: **Configure Microscope** menu*

No.	Parameter	Description
1	**Back** button	Close the menu.
2	Configuration list	The microscope and the camera are recognized automatically.
3	**Delete** button	Delete the selected microscope configuration from the list.
4	**Add** button	Perform auto configuration to add the new microscope configuration to the list.
5	**Apply** button	Apply the changes.
6	**Setup** button	Opens the shading correction setup menu, see *Performing a Shading Correction [▸ 40]*.
7	Microscope configuration area	Select the microscope configurations.
8	Objective selection/Reflector selection area	Select the objective and the reflector set, see *Assigning Objectives and Filter Sets [▸ 38]*.

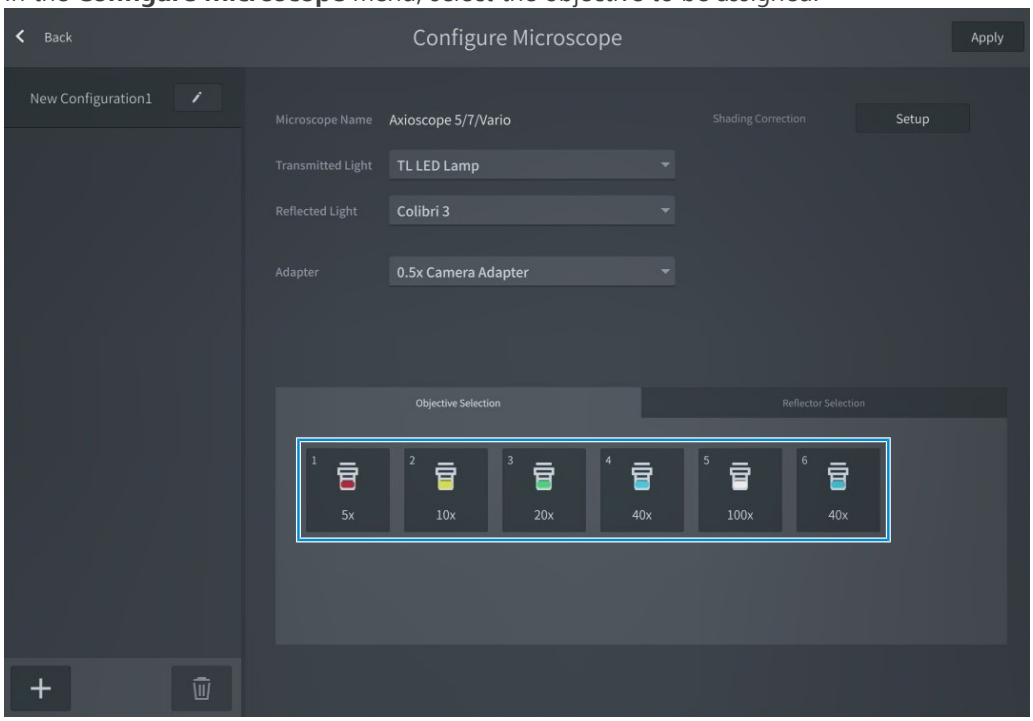
See also

Configure Microscope Menu [▸ 37]

5.5.1 Assigning Objectives and Filter Sets

Prerequisite ✓ The microscope is operational.

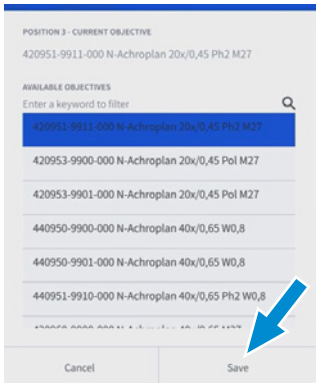
Procedure 1. In the **Configure Microscope** menu, select the objective to be assigned.



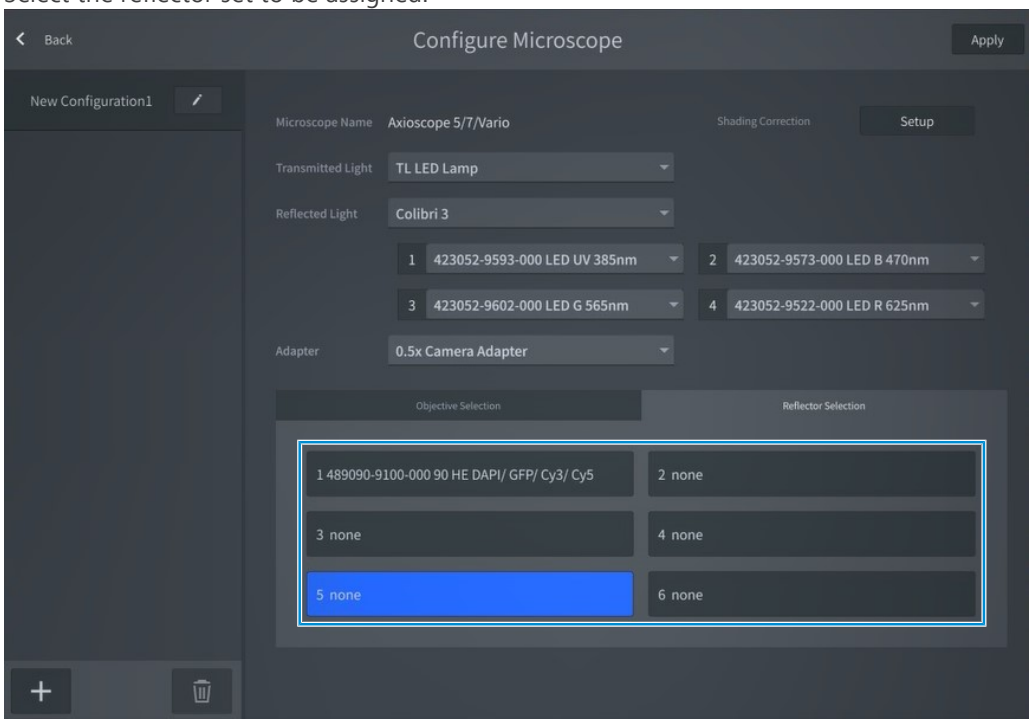
→ The **Objective** submenu opens.

2. Select one of the available objectives from the list.

3. Click **Save** to apply the selection.

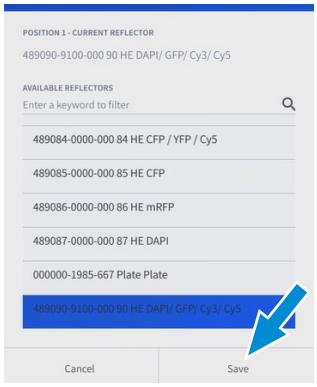


4. Repeat the procedure for other objective positions, if required.
5. Click on the **Reflector selection** tab.
6. Select the reflector set to be assigned.



→ The **Reflector selection** submenu opens.

7. Select one of the available reflector modules from the list.
8. Click **Save** to apply the selection.



9. Repeat the procedure for other reflector set positions, if required.
10. Click **Apply** to save the selection.
11. Click **< Back** to return to the live image.

5.5.2 Performing a Shading Correction

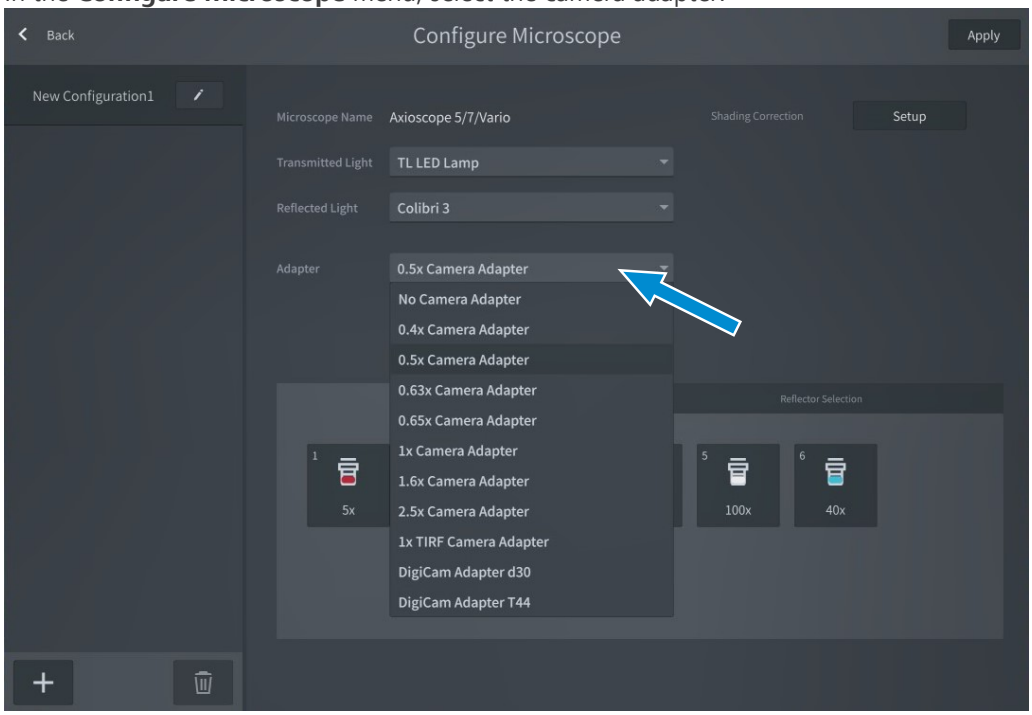
Info

Insufficient image quality after changing the configuration of the microscope.

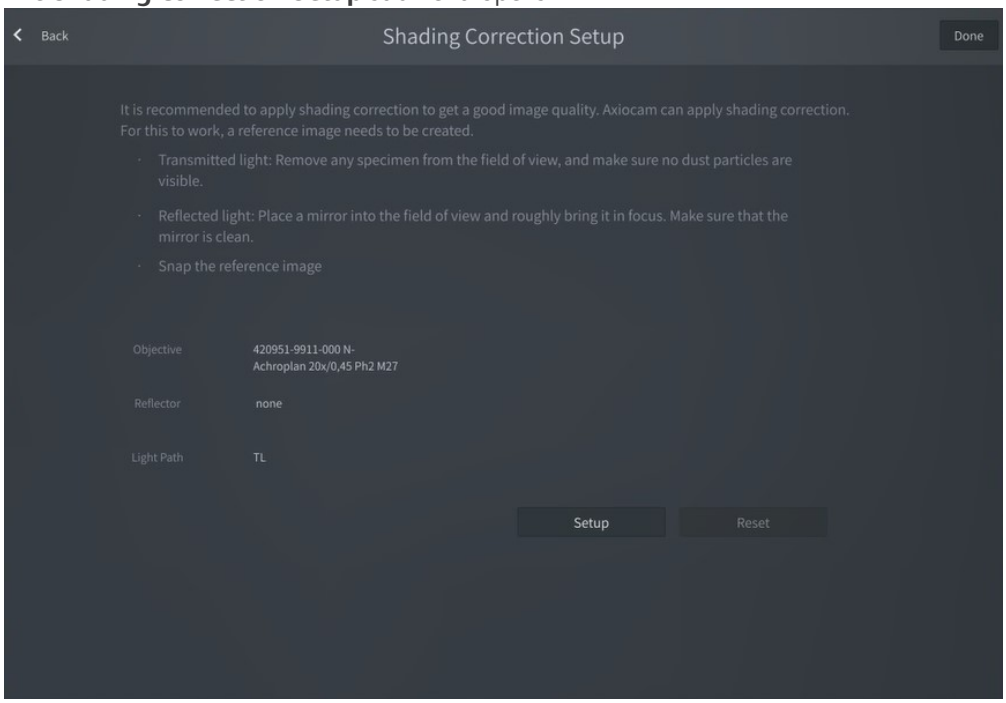
It is recommended to perform a shading correction for each objective of any newly configured microscope before starting to work.

Prerequisite ✓ The microscope is operational.

Procedure 1. In the **Configure Microscope** menu, select the camera adapter.



2. Click on the **Setup** button.
   → The **Shading correction Setup** submenu opens.



3. Read and observe the on-screen hints on how to perform an individual shading correction.

4. Click on the **Setup** button.

5.6 Global Settings Menu

The **Global Settings** menu contains four layers, which can be selected by clicking the corresponding tab:

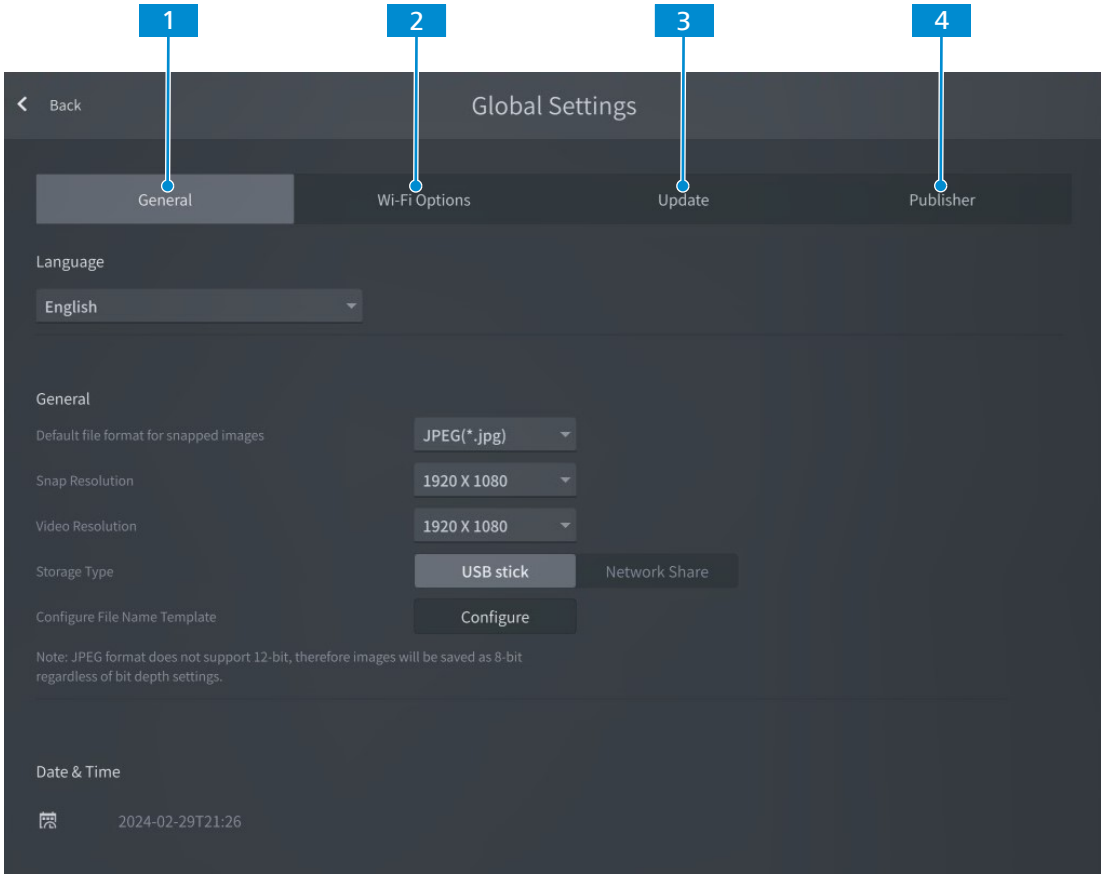


*Fig. 11: **Global Settings** menu*

1	General Tab	2	Wi-Fi Options Tab
3	Update Tab	4	Publisher Tab

5.6.1 General Tab

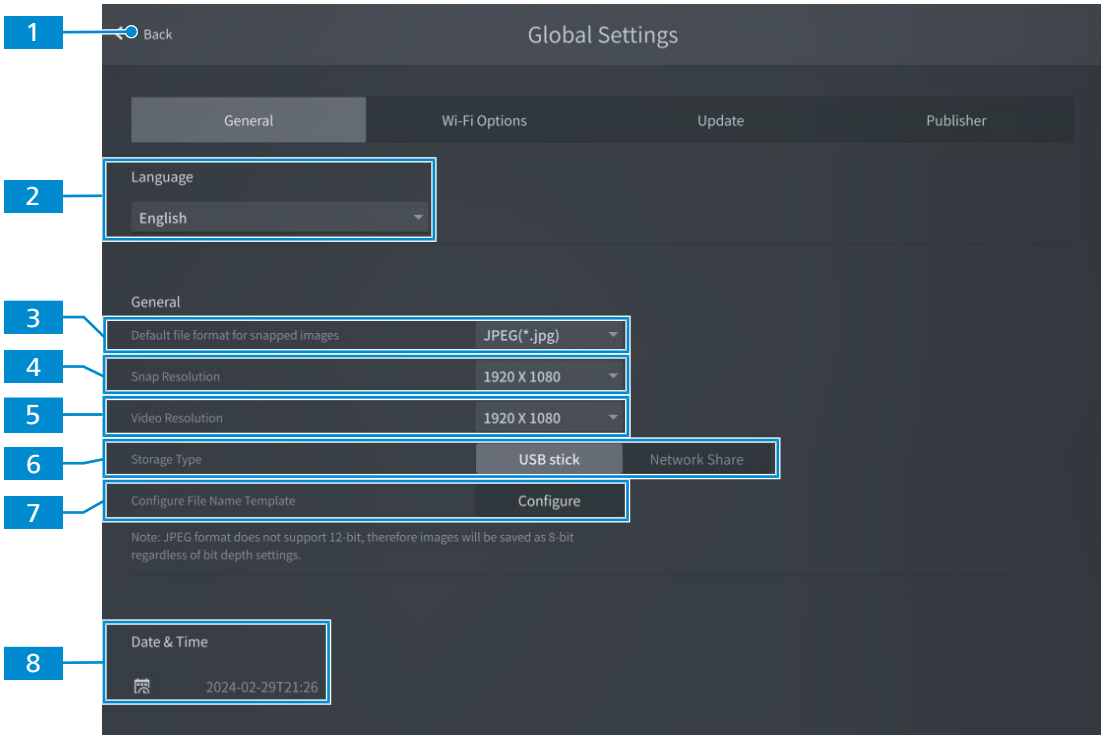


*Fig. 12: **Global Settings** menu, **General** tab 1*

No.	Parameter	Description
1	**Back** button	Close the menu.
2	**Language selection** drop down menu	Select the language of the application.
3	**Default file format** drop down menu	Select the default file format for the generated images.
4	**Snap Resolution** drop down menu	Select the resolution for snapped images.
5	**Video Resolution** drop down menu	Select the resolution for recorded videos.
6	**Storage Type** tab	Select the type of file format for storage.
7	**Configure File Name Template** button	Configure the file name template.
8	**Date & Time** setting field	Set date and time.

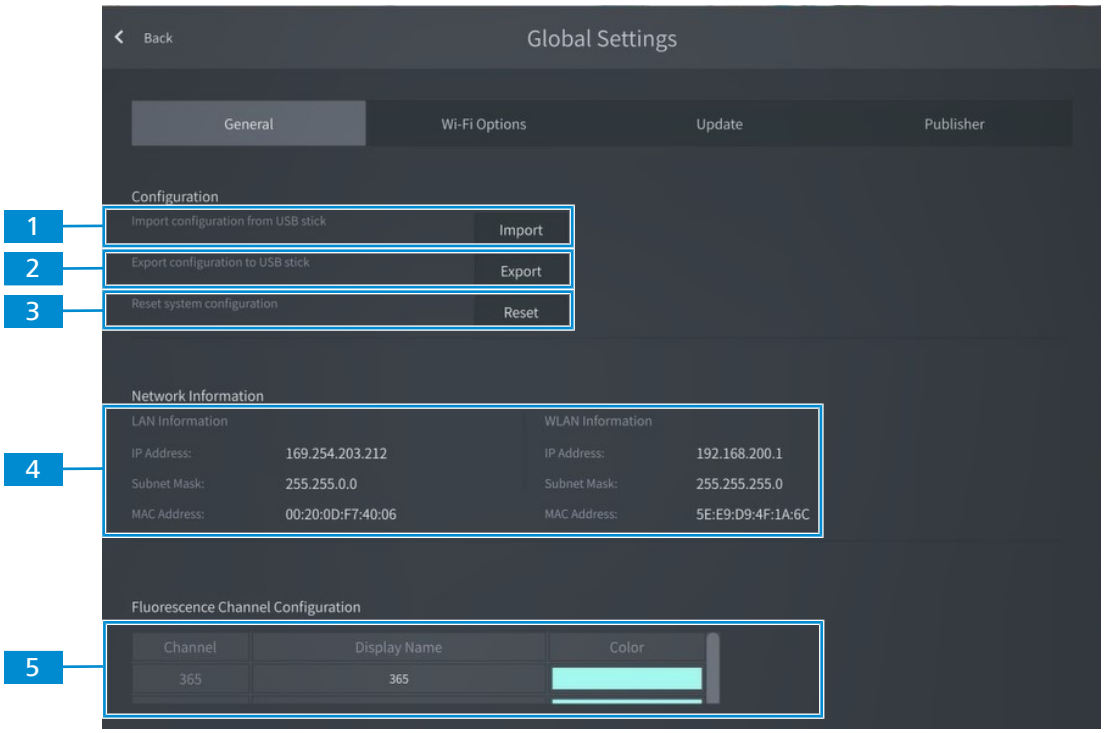


*Fig. 13: **Global Settings** menu, **General** tab 2*

No.	Parameter	Description
1	**Import** button	Import an existing configuration file.
2	**Export** button	Export the configuration file.
3	**Reset** button	Reset the system configuration. Reset all camera settings and microscope configurations to factory settings.
4	Network Information	Network Information is displayed.
5	Fluorescence Channel Configuration	Pseudo colors for respective fluorescence channel can be assigned.

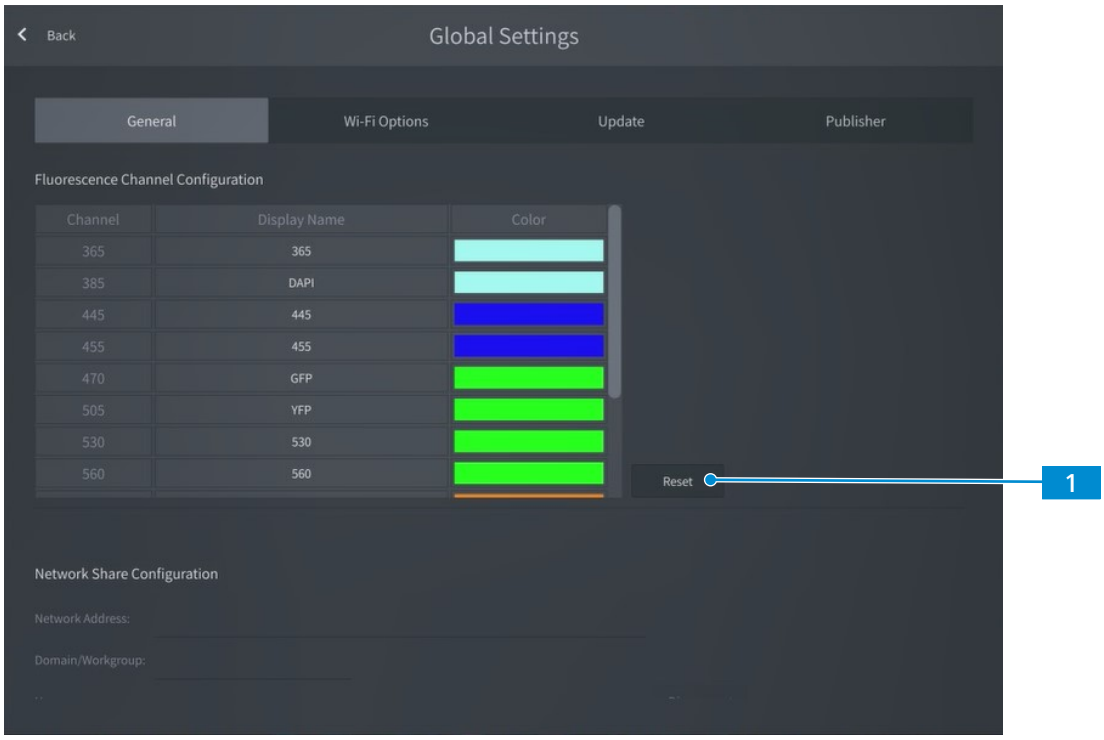


*Fig. 14: **Global Settings** menu, **General** tab 3*

No.	Parameter	Description
1	**Reset** button	Reset the fluorescence channel configuration.

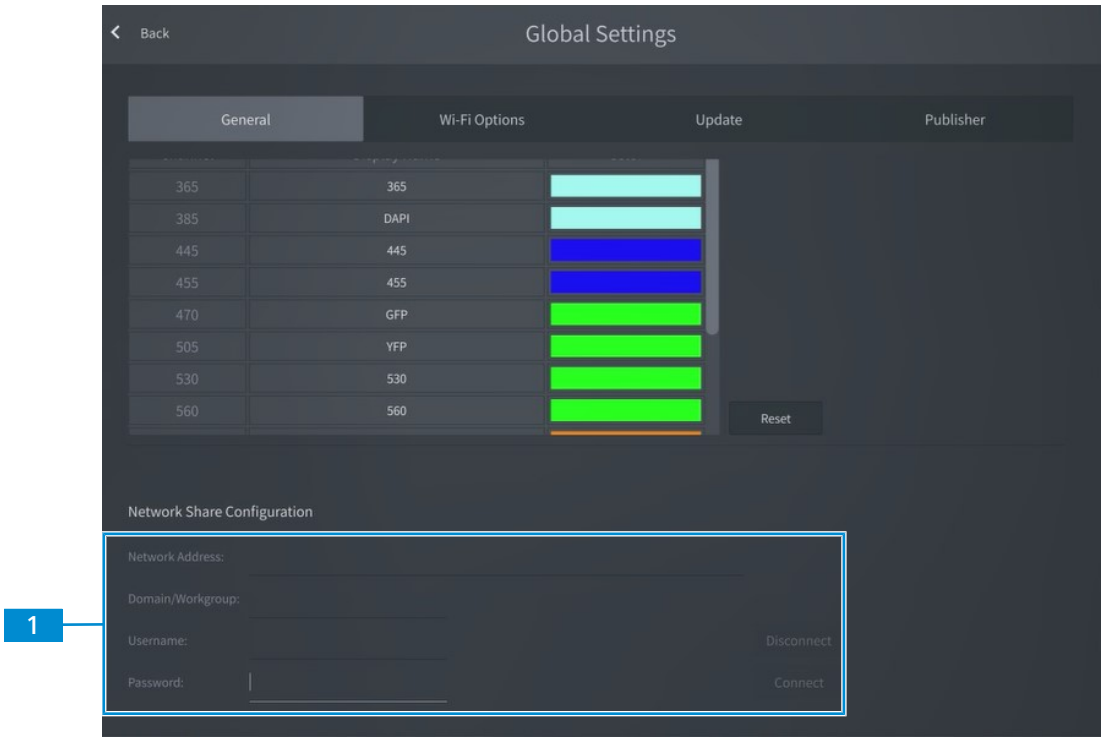


*Fig. 15: **Global Settings** menu, **General** tab 4*

No.	Parameter	Description
1	Network Share Configuration	Set the network address/ domain/ workgroup/ username/ password.

5.6.2 Wi-Fi Options Tab

As an access point

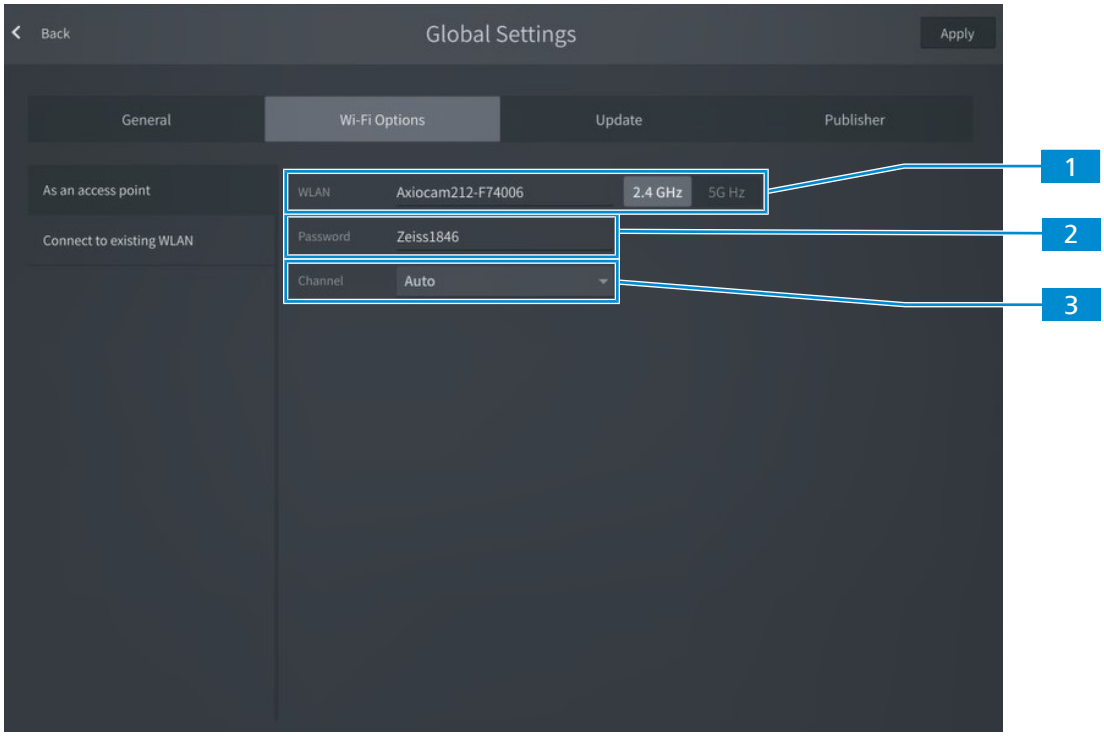


*Fig. 16: **Global Settings** menu, **Wi-Fi Options** tab **As an access point** settings*

No.	Parameter	Description
1	**WLAN** setting field and **GHz** button	Set the WLAN name and select the frequency.
2	**Password** setting field	Set the password.
3	**Channel** drop down menu	Select the channel.

Connect to existing WLAN

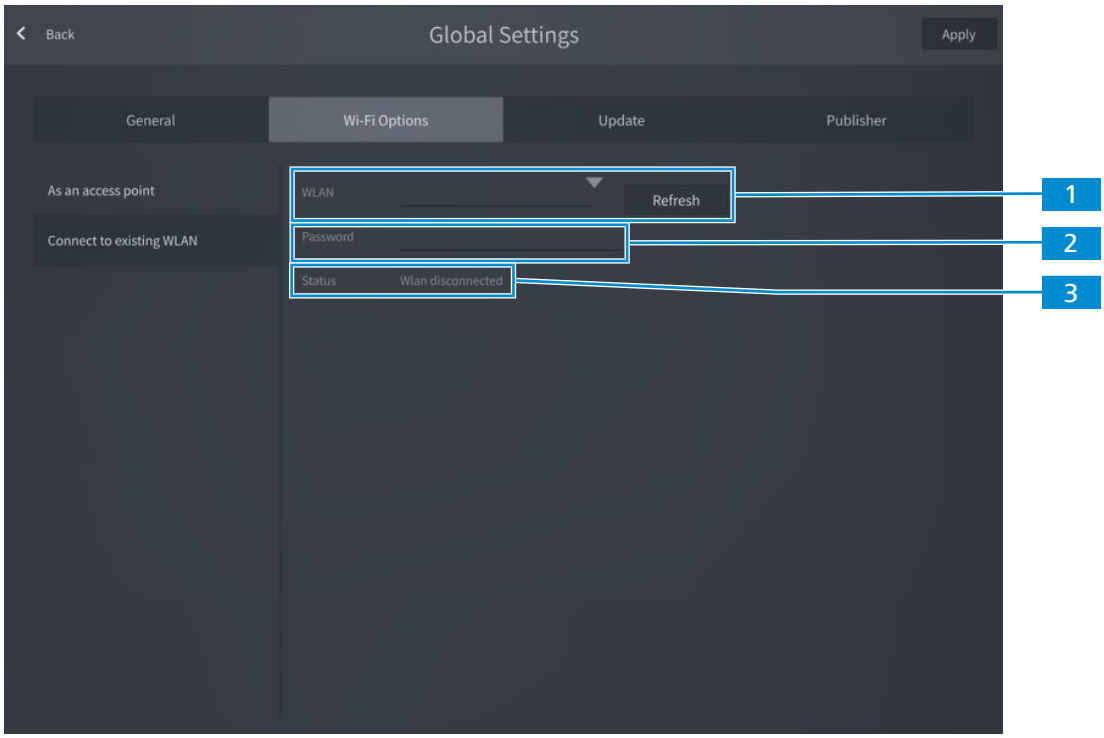


*Fig. 17: **Global Settings** menu, **Wi-Fi Options** tab **Connect to existing WLAN** settings*

No.	Parameter	Description
1	**WLAN** drop down menu	Select the WLAN you want to connect to.
2	**Password** setting field	Set the password.
3	Status	The network status is displayed.

5.6.3 Update Tab

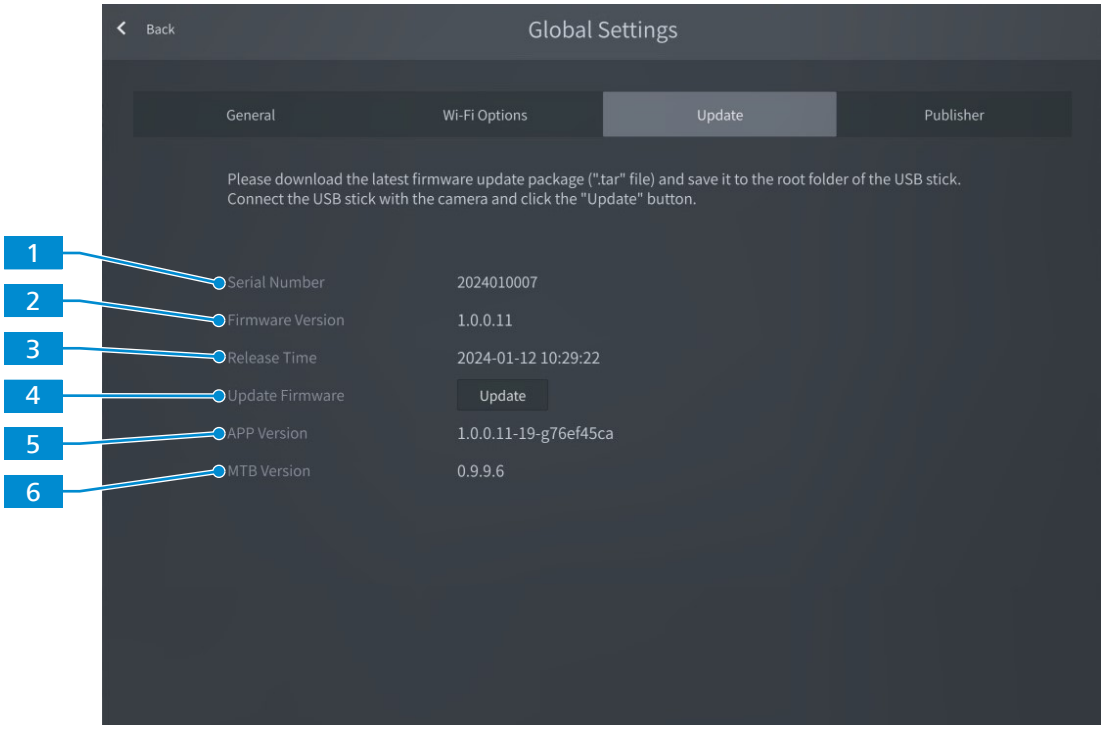


*Fig. 18: **Global Settings** menu, **Update** tab*

No.	Parameter	Description
1	Serial Number	The serial number of installed firmware is displayed.
2	Firmware version	The version of the installed firmware is displayed.
3	Release Time	The release date and time of the installed firmware is displayed.
4	**Update** button	Start a firmware update.
5	APP Version	The version of the installed APP software is displayed.
6	MTB Version	The version of the installed MTB software is displayed.

5.6.4 Publisher Tab

The **Publisher** tab displays legal information regarding the publisher as well as links to the user support forum, data protection notice, and end user license agreement.

6 Installing Software and Drivers

6.1 Installing Software on PC

To acquire images with the camera(s) on a PC, you must install ZEISS software (e.g. ZEN or Labscope). You will find links to the software manuals on the delivered flyer. The camera drivers are also installed during the software installation. The latest version of ZEISS software products can be downloaded via ZEISS Microscopy Installer or from the ZEISS Portal web page.

Info

For information on how to acquire images with the specific software, refer to the respective software manual.

6.1.1 Installing ZEN via ZEISS Microscopy Installer

NOTICE

- The installation of **ZEN** and other components is performed using the **ZEISS Microscopy Installer**. Download the **ZEISS Microscopy Installer** in the **ZEISS Portal** from the **Download Center** under https://portal.zeiss.com/download-center/softwares/mic.
- Do not install an older ZEN version over a newer ZEN version.
- If ZEN is already installed on your PC, during installation the current version will be uninstalled first.
- Depending on your PC configuration, the system requests an optional restart at the **beginning** of the installation.
- The system requests a restart at the **end** of the installation. This restart is required for the successful camera driver installation. You can postpone the restart until all components selected in the **ZEISS Microscopy Installer** are installed. After restart of the computer, reopen the **ZEISS Microscopy Installer** to install remaining components.
- In case of installing ZEN on a SEM system, make sure that SmartSEM is not running when installing ZEN.

Prerequisite

- ✓ Your system is connected to the Internet.
- ✓ You have opened the **ZEISS Microscopy Installer** with admin rights and you are logged in.
- ✓ You have selected (default setting) the online installation, see **ZEISS Microscopy Installer** manual.

Procedure

1. Open the **Install** tab.
2. On the left, activate **ZEN** with the respective version number.
   → The available components and tools for installation are displayed on the right side.
3. On the right side, activate all components you want to install.
   → If the **3rd party Python Tools** are not installed, the machine learning based Intellesis functionalities will not work. This also includes their use in other parts of the software, like the neural networks in certain Bio Apps.
4. Activate **I agree to the Terms and Conditions of the selected software**.
5. Click **Install**.
   → The selected components are downloaded and installed. The status is displayed in the ZEISS Microscopy Installer.
6. After successful installation, close the **ZEISS Microscopy Installer** and restart your PC to complete the installation.

6.1.2 Installing Labscope for Windows

Procedure

1. Download the latest **Labscope** for Windows via the product website: https://www.zeiss.com/labscope
   → You will be directed to the ZEISS Portal for downloading the installation files.
2. Double-click on **LabscopeSetup_vx.exe** to install the software.
3. Perform the required steps shown by the installation wizard. Agree if you are asked to install additional drivers.
   → Some modules of Labscope require additional installation, e.g. **BioModuleSetup.exe**, which is for **AI Cell Counting and AI Cell Confluency** models, and you can find the installer in the same page of Labscope download in Zeiss Portal.

Alternatively, you can install **Labscope** via ZEISS Microscopy Installer

6.2 Installing Labscope for Android or iOS

For Android

Procedure

1. Open the Google Play Store.
2. Search for **Labscope** by ZEISS.
3. Download **Labscope**.
4. Follow the instructions on your Android device to install the app.

For iOS

Procedure

1. Open the App store.
2. Search for **Labscope** by ZEISS.
3. Download **Labscope**.
4. Follow the instructions on your iOS device to install the app.

6.3 Installing TWAIN Plugin on PC

The TWAIN plugin for Axiocam 212 color / 203 mono is a standardized software interface to call up and control basic camera functions via a TWAIN-compatible non-ZEISS app.

Procedure

1. Go to https://portal.zeiss.com/download-center/softwares/mic.
2. Select **TWAIN** from the list.
3. Click on the **Download** Button.
   → The installation file is downloaded.
4. Open your **Downloads** folder and unzip the TWAIN installation file.
5. Double-click the **TWAIN** installation file (.exe).
6. Follow the instructions of the wizard.

For more information see the **Quick Guide ZEISS TWAIN for Axiocam**. You can find the PDF document in the **TWAIN** download folder.

6.4 Installing TWACKER DEMO Application

To demonstrate the image acquisition with the **TWAIN** plugin you can use the **TWACKER** application. **TWACKER** is not mandatory for operating the **TWAIN** plugin. If your laboratory software supports the **TWAIN** standard, you don't need to install **TWACKER**.

Procedure

1. Go to https://portal.zeiss.com/download-center/softwares/mic.
2. Select **TWAIN** from the list.
3. Click on the **Download** Button.

→ The installation file is downloaded.

4. Open your **Downloads** folder and unzip the TWAIN installation file.
5. Double-click the **TWACK_32.msi** installation file.
6. Follow the instructions of the wizard.

For more information see the **Quick Guide ZEISS TWAIN for Axiocam**. You can find the PDF document in the **TWAIN** download folder.

7 Acquiring Images and Videos

7.1 Introduction

The Axiocam 212 color and the Axiocam 203 mono are high definition cameras for color and monochromatic imaging, respectively. They are suitable for use as accessories for educational and routine microscopy in laboratory environments and for use by trained laboratory personnel. The cameras have been designed to be used in the field of light microscopy for general observation, routine work, and simple applications in which a sufficient amount of light is available.

7.2 Basic Procedure using OSD Menu

Prerequisite

- ✓ The USB flash drive and mouse/keyboard have been inserted into the respective USB interfaces of the camera.
- ✓ The camera is connected to a monitor via HDMI.
- ✓ The OSD menu has opened by moving the mouse over the live view screen.

Procedure

1. Position your specimen on the microscope and adjust the microscope to see a focused image on the monitor.
2. To take a single image, click on the **Snap** button in the **Live View** menu.
   → The image is saved to the USB flash drive in either JPEG or TIFF format.
3. To start video recording, click on the **Record** button in the **Live View** menu.
4. To finish video recording click on the **Stop** button in the **Live View** menu.
   → The video is saved to the USB flash drive in MP4 format.

7.3 Image Acquisition with Labscope

Upon first starting Labscope, each screen starts with an overlaying information screen explaining the functions. Refer to the displayed information for using the software. Disable or re-enable the information screens in the software`s **Settings** menu on your PC monitor iPad.

Info

For support in using Labscope, visit our support forum under https://forums.zeiss.com/microscopy/community/viewforum.php?f=38. Check the Labscope threads for problem-solving notes.

8 Care and Maintenance

To ensure the optimum performance of the device, preventive maintenance work should be performed at regular intervals.

Time interval	Component	Activity
As required	Infrared filter or protective glass	Cleaning
As required	Firmware	Update

Tab. 3: Maintenance plan

8.1 Optical System

The internal optical components of the camera should always be protected. If no lens, or camera adapter with optics, is screwed into the camera's C-Mount thread, the camera's sensor and protective glass must be protected by screwing the protective cap onto the camera's C-Mount thread.

8.2 Cleaning the Infrared Filter or Protective Glass

NOTICE

Sensitive optical parts

An inadequate handling of optical components may damage the components or decrease the device's imaging quality. The unauthorized handling of device components leads to the loss of warranty.

- Do not remove the filter or the protective glass.
- Do not clean the sensor directly.
- Do not use tap water to clean the IR filter.

Tool / part	Quantity
Soft brush	1
Cotton	1
Distilled water and 70% ethanol Always follow instruction from ZEISS microscopy web page: https://www.zeiss.com/microscopy/en/c/edr/20/how-to-keep-your-microscope-clean.html	1

Tab. 4: Tools and parts

Procedure

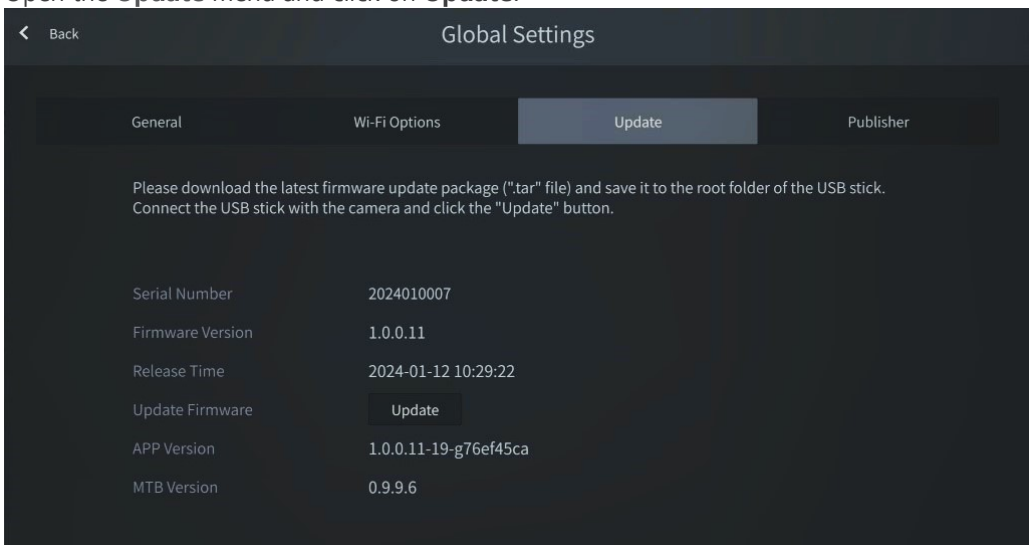
1. Use a soft brush or cotton to wipe away dry dust from the front side of the infrared filter or the protective glass.
2. Use cotton and 70% ethanol for optics to wipe away more serious contamination from the infrared filter.

8.3 Updating the Firmware

Follow the subsequent instructions to update the camera's firmware:

Procedure

1. Download the latest firmware for your respective camera from the webpage https://portal.zeiss.com/download-center/softwares/mic/software/13053/.
2. Save the latest firmware update package (".tar" file) to the root folder of the USB flash drive (contained in the scope of delivery).
3. Insert the flash drive into the USB 3.0 Type C of the camera.
4. At the OSD menu, navigate to **Global Settings**.
5. Open the **Update** menu and click on **Update**.



→ Note that the update procedure takes several minutes.

→ Do not operate the camera or unplug the USB flash drive during the update procedure.

↳ The firmware is updated.

9 Troubleshooting

9.1 ZEN Software

Symptom	Cause	Measure
Camera does not appear in the menu for selectable cameras.	The camera is not properly connected.	Check and adjust the camera connections to PC and power supply, if necessary.
	The software and the drivers are not properly installed.	Make sure you installed the software and the drivers with administrative rights and according to the instructions in this manual.
	Incompatible accessories (e.g. USB adapters, cables etc.) were used, so the camera was brought into wrong mode and failed to be recognized.	**Procedure** 1. Connect the camera to the PC with the accessories provided in the delivery package. 2. Restart the camera.
	The PC's USB driver is outdated.	Upgrade to the latest driver provided by the PC manufacturer.
No camera image visible on the screen.	The camera is not properly connected.	**Procedure** 1. Make sure, the camera's status LED constantly lights blue. 2. If necessary, check and adjust the camera connections to PC and power supply. 3. Restart the camera.
	The illumination reaching through to the camera is not sufficient.	**Procedure** 1. Check the light path settings of the microscope. 2. If necessary, check and adjust the position of the beam splitter between the ocular and the camera port. 3. If necessary, check and adjust the setting of the aperture diaphragm of the microscope, if necessary. 4. Execute an automatic exposure measurement.
	Inappropriate display settings are used.	Check and adjust the display device's settings for live imaging, if necessary.
The color of the displayed image taken by Axiocam 212 color does not correspond to the image seen through the eyepieces.	The color matching is inappropriate.	Set the color temperature. Check the monitor's color temperature setting. If necessary, reduce the color temperature to the lowest value possible.

Symptom	Cause	Measure
The color of the displayed MCF image taken by Axiocam 203 mono does not correspond to the image seen through the eyepieces.	Unsuitable overlay colors are used to represent fluorescence dyes.	Select alternative overlay colors.

9.2 Camera

Symptom	Cause	Measure
The LED indicator is off.	The camera is not powered on properly.	Make sure the camera is powered by the plug-in power supply and switched on.
The LED indicator flashes red.	The camera is updating firmware or being reset.	**NOTICE Do not switch off the power supply.**
The image / video cannot be saved to the USB flash drive.	USB flash drive is not in correct format.	Format the USB flash drive to FAT32 format on a PC.
	USB flash drive has not enough free memory.	Make sure there is enough free memory on the flash drive.
	USB flash drive cannot be recognized.	Restart the camera.
The firmware update does not function.	USB flash drive is not in correct format.	Format the USB flash drive to FAT32 format on a PC.
	USB flash drive does not enough free memory.	Make sure there are at least 200 MB of free memory on the USB flash drive.
	USB flash drive cannot be recognized.	Restart the camera.
	The firmware cannot be found.	Make sure the latest firmware is stored to the root folder of the USB flash drive.
	The firmware is not uploaded properly.	Restart the firmware update process and exactly follow the instructions in the firmware update menu.
The camera date and time is not correct.	Date and time are not set correctly.	**Procedure** 1. At the OSD menu, navigate to **Settings > Operating System**. 2. Tap the **Date & Time** button. 3. Set the camera date and time.
	The buffer battery is empty.	Contact your local ZEISS service organization to change the battery. The expected battery lifetime is approx. 4-5 years.
The image has severe noise.	The amplification (gain) is set too high.	Manually reduce the gain value.
	The exposure time is set too low.	Manually adjust the exposure time.

Symptom	Cause	Measure
	The light intensity is set too low.	Increase the light intensity. Activate denoise function in Image setting menu.
The image is too dark or too bright.	Automatic exposure time has not been activated.	Activate the automatic exposure settings or manually adjust the exposure settings to the current light situation.
The camera settings are not saved after a camera restart.	The camera has been powered off to early after changing the settings.	For the settings to be automatically stored, wait at least 5 seconds after changing the settings before you power off the camera.
Monitor connected via HDMI does not display an image.	The camera is not delivering a signal, or signal is not compatible with the monitor.	Ensure that the camera has been switched on for at least 30 seconds and the LED indicator is blue. Check the plug connections on the camera and monitor.
The image appears distorted on full screen monitor.	The monitor's image aspect ratio is not set to 16:9.	Set the monitor's aspect ratio to 16:9.
The image is blurred on the screen, but the sample is in focus through the eyepieces.	The focus plane of the camera is different from that of the eyepieces.	**Procedure** 1. Focus the sample through the eyepieces. 2. Calibrate the camera adaptor until image is in focus on the monitor. If camera adapter cannot be calibrated, adjust at microscope focus knob until camera image is in focus.
The Camera otherwise behaves abnormally.	The camera may have been brought into a non-intended state.	Press the reset to factory settings button on the camera.

9.3 Labscope

Info

For support in using Labscope, visit our support forum under https://forums.zeiss.com/microscopy/community/viewforum.php?f=38. Check the Labscope threads for problem-solving notes.

10 Disposal

The product must not be disposed of as domestic waste or through municipal disposal companies. It must be disposed of in accordance with applicable regulations (WEEE Directive 2012/19/EU). ZEISS has implemented a system for the return and recycling of devices in member states of the European Union that ensures suitable reuse according to the EU Directives mentioned.

For detailed information on disposal and recycling consult your ZEISS Sales & Service Partner.

Instruction Manual ZEISS Axiocam 212 color / 203 mono
en-US | Rev. 2 | 10/2024

Carl Zeiss Microscopy GmbH
Carl-Zeiss-Promenade 10
07745 Jena
Germany

phone: +49 1803 33 63 34
fax: +49 3641 64 3439

info.microscopy.de@zeiss.com
www.zeiss.com/microscopy