



Instruction Manual

ZEISS Axiocam 105 color

Version R2



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Original Manual

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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

This camera is a high-resolution digital microscope camera with a color CMOS sensor and USB 3.0 interface for light microscopy applications. To make it easier for you to set up the camera, follow the instructions in these chapters step by step. In this manual the interface between the camera and the computer is called USB 3.0.

Content This document contains all the information you need to set up the microscope, start the software, and perform troubleshooting and maintenance. It contains the following chapters:

Chapter	Content
About this Instruction Manual	Introduction and overview about this manual.
Safety	Important information on safe handling with the camera. Read this chapter before unpacking the camera and putting it into operation.
Technical Data and Conformity	Here you will find the 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.
Installing Software and Drivers	Here you will learn how to install ZEISS software and camera drivers.
Care and Maintenance	This chapter describes some measures for the maintenance and care of your camera. In case of greater damage, always contact ZEISS support.
Troubleshooting	In this chapter we have listed some solutions to various problems. If you can not solve your problem, contact ZEISS support.
Disposal	Information on the disposal of the product.

1.2 Text Conventions and Link Types

Example	Explanation
	The names of controls and important information are shown in bold letters, for instance:

Example	Explanation
Click Start .	Software controls and GUI elements.
Press the Standby button.	Hardware controls and elements.
Press Enter on the keyboard.	Key on the keyboard.
Press Ctrl + Alt + Del .	Press several keys on the keyboard simultaneously.
Select Tools > Goto Control Panel > Airlock .	Follow a path in the software.
Enter <i>example.pdf</i> in this field.	Text to be entered by the user.
<code>Programming and Macros</code>	Anything typed in literally during programming, including, for example, macro codes, keywords, data types, method names, variables, class names, and interface names.

Tab. 1: Text conventions

Example	Explanation
See: <i>Text Conventions and Link Types</i> [▶ 5].	Link to further information for this topic.
https://www.zeiss.com/corporate/int/home.html	Link to a website on the internet.

Tab. 2: Link types

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 operator better understand the contents of this document.

2 Safety

2.1 Intended Purpose

The product is a high definition microscope camera for color imaging. It is suitable for use as an accessory for educational and routine microscopy in laboratory environments and for use by trained laboratory personnel. The camera has 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.

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

2.2 General Safety Information

This document must be read before commissioning in order to ensure safe and uninterrupted operation. Pay particular attention to all listed safety notes. Make sure, that

- the operating personnel has read and understood this manual, associated documents, and particularly all safety regulations and instructions, and applies them.
- the local and national safety and accident prevention regulations must be observed, as well as the applicable laws and regulations in your country.
- this document is always available at the place of use of the product.
- the product is always in perfect condition.
- the product is secured against access by unauthorized persons.
- maintenance and repair work, retrofitting, removal or replacement of components, as well as any other intervention in the product not described in this document, may only be carried out by the manufacturer ZEISS or persons expressly authorized by ZEISS to do so.

2.2.1 Requirements for Operators

The product, components, and accessories may only be operated and maintained by authorized and trained personnel. The product may only be used in accordance with this document. If the product is not used as described, the safety of the user may be impaired and/or the product may be damaged.

Any unauthorized intervention or use other than within the scope of the intended use shall void all rights to warranty claims. The regional regulations on health protection and accident prevention must be observed at all times and during all work on and with the product.

2.2.2 Safe Operating Condition

If circumstances occur which impair safety and cause changes in operating behavior, the product must be shut down immediately and a ZEISS service representative should be informed.

The product may only be operated if the operating conditions are adhered to.

- Do not operate the product until you have completely read and understood the entire documentation.
- Ensure conditions and take measures to prevent the build up of electrostatic charge on the workplace.

2.3 Prevention of Hazards

This product has been manufactured and tested by ZEISS according to the regulations specified in CE and has left the manufacturer's premises in perfect working order. The camera is intended to be used in a basic electromagnetic environment while the noise emission conforms to CISPR 11 Class B level. The EMC performance might be impaired while integrated into a system. 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.

CAUTION

Personal Injury

To avoid personal injury, read and adhere to the safety notes below.

- ▶ 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.

NOTICE

To avoid equipment damage, data loss, or corrupted data, read and adhere to the safety notes below.

- ▶ Protect the camera against mechanical impact. External damage may affect the operation of inner components.
- ▶ Keep chemicals and fluids away from the camera.
- ▶ 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.
- ▶ Use the camera in a clean and dry location.
- ▶ Attach all connectors firmly and securely.
- ▶ 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.
- ▶ 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.

3 Technical Data and Conformity

3.1 Axiocam 105 color R2

Feature	Value
Sensor Type	CMOS color sensor
Number of Pixels	2592 px x 1944 px (horizontal x vertical) = 5 megapixels
Pixel Size	2.2 μm x 2.2 μm
Chip Size	5.70 mm x 4.28 mm, corresponds to 1/2.24"
Live Image Frame Rate	2592 px x 1944 px (horizontal x vertical) Frame rate @1 ms: 30 fps
Sensor Subarea Readout (ROI)	Freely adjustable Min. size: 864 px x 1 px (horizontal x vertical)
Digitization	8 Bit / pixel
Exposure Time	30 μs up to 1 s
Interface (camera)	USB 3.0 Micro-B
Interface (PC / card)	USB 3.0 Standard-A
Optical Interface	C-Mount adapter
Dimensions	29 mm x 29 mm x 17.0 mm (height x width x depth)
Operating System	Microsoft® Windows 10
Certificates	CE, FCC Class B, RoHS
Power Supply	Via USB 3.0 interface
USB Power	5 V, max. 400 mA
Environment Conditions	0° ... + 50° Celsius, max. 80% relative air humidity, no condensation, free air circulation required
Order Number	426555-9010-000

Info

Computer hardware, operating system and software may decrease the frame rates. Selecting a part of the sensor area or applying binning can increase the frame rate. All specifications are subject to change without notice.

3.1.1 Spectral Sensitivity

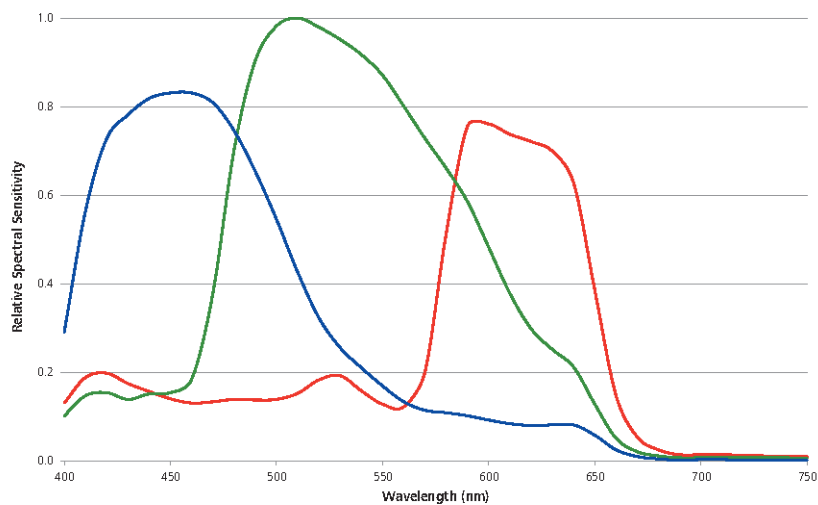


Fig. 1: Spectral Sensitivity Axiocam 105 color R2

3.2 Applicable Standards and Regulations

Observe all general and country-specific safety regulations as well as applicable environmental protection laws and regulations. This product is in compliance with the requirements of the following regulations and directives:

2014/30/EU	Electromagnetic Compatibility
2011/65/EU	and amendment directive (EU) 2015/863 - RoHS - Restriction of the use of certain hazardous substances in electrical and electronic equipment
CE	The product fulfills the standards and regulations mentioned above and is compliant to the CE guideline

For more information on CE Declarations of Conformity, contact your ZEISS Sales & Service Partner.



4 Shipment

Content	Ord. no
1 x Axiocam 105 color R2 camera	426555-9010-000
1 x USB 3.0 data cable	
1 x Download information for ZEISS software and instruction manual	
Optional accessories (recommended): PCI express interface card	000000-0591-463

5 Connecting the Camera

5.1 Installing the interface card

This chapter describes how to install the PCI express interface card (2 x USB 3.0) into your PC.

NOTICE

Static Electricity

Static electricity can damage electronic components. To protect electronic components against static electricity, do not touch them until you have grounded yourself to the casing of the device. Never touch the contacts of the electronic components. We also recommend that you work only on an antistatic mat.

Prerequisite ✓ You have read the documentation of the interface card and of your computer before inserting the interface card.

1. Switch off your PC and all connected peripherals.
2. Disconnect the PC and the peripherals from the mains and open the computer case.
3. Insert the PCIe interface card into the appropriate slot on your computer.
4. Close the computer case and reconnect the peripherals.

You can now mount the camera on the microscope and connect it to the PC, see chapter Connecting the camera to the PC.

5.2 Mounting the camera on the microscope

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

Camera Adapter	Description
Camera Adapter 60N-C 2/3" 0.5x	426112-0000-000
Camera Adapter 60N-C 2/3" 0.63x	426113-0000-000
Camera Adapter 95P-C 1/2" 0.5x	415501-1811-000
Camera Adapter 95P-C 2/3" 0.65x	415501-1810-000

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 (P95) port.
4. Orient the camera to the stand and fix its position by tightening the ring nut.

5.3 Connecting the camera with PC

1. Lay the supplied USB 3.0 cable carefully between the camera and the PC.
NOTICE! Make sure that the cable is in a safe distance from hot light sources on the microscope, to prevent damage from heat.
2. Connect the USB 3.0 cable to the camera. Tighten the screws with a screwdriver until it is finger tight.

3. Connect the other end of the USB 3.0 cable to the USB 3.0 interface of the main board (and not USB 2.0) or the recommended USB 3.0 PCIe interface card.
4. Switch on your PC if its not switched on already. The camera is ready for use.

Info

Power is supplied to the camera via the USB 3.0 interface. If you switch off the PC, the camera is also switched off.

5.4 Function indicator

After you have switched on the PC, the LED on the camera will light up red. As a rule, if the LED is red, this indicates that power is being properly supplied to the camera via the data cable. However the driver has not yet been installed. For the definitions of the LED color signals, refer to the list below:

Signal	Meaning
Red	Power supplied; no driver loaded, camera not detected
Green flash 3x	USB 3.0 connection detected
Green	Driver loaded; camera ready
Off	No power supplied

6 Installing Software and Drivers

- Prerequisite**
- ✓ To install the software for image acquisition, you must install the [ZEISS Microscopy Installer](#). The camera drivers will be installed automatically during the installation of the software.
 - ✓ Before starting the installation of the software and drivers, the camera must be connected to the PC.
 1. Install the software according to the installation guide delivered with the software.
 2. During the installation you will be asked to install the camera drivers. Follow the procedure by confirming the upcoming messages.
 3. Restart your PC after the installation.
 4. You can check in the device manager if the driver installation was successful.

You can now start acquiring images with your camera using ZEISS software. For more information, please read the software documentation.

7 Care and Maintenance

7.1 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.

7.2 Cleaning the infrared filter or protective glass

Contamination of the IR filter (for color cameras only) or the protective glass has an adverse effect on the quality of the resulting image (dark points, cloudy structures in the image). If there is dry dust on the front side of the infrared filter or protective glass, you can clean it with a soft brush or with cotton (wool). Use cleaning fluid for optics/lenses only to clean the IR filter. Do not use tap water to clean the IR filter.

8 Troubleshooting

8.1 The camera does not appear in the menu of selectable cameras

- Make sure that you have connected the camera and installed the software and drivers in accordance to the instructions in this manual.
- Make sure that you installed the software and drivers with administrative rights. Install the driver with administrative rights again if necessary.

8.2 You don't see a camera image on your screen

- Check if you have started ZEN and clicked the live image button.
- Check the light path setting of the microscope.
- Is the status LED on the camera on? If not, check the cable connections between camera and computer.
- Reset the camera parameters to default values.
- Execute an automatic exposure measurement.
- Check the display adjustments for the live image.
- Check the aperture diaphragm of the microscope.
- Check the position of the beam splitter between the ocular and the camera port.

For operating the camera with the software, see ZEN Help. Press the **F1** key to access the context-sensitive ZEN Help.

8.3 The color of my image does not correspond to the impression through the ocular

In case of color cameras:

- Check white balance and, if necessary, repeat white balance.
- Check the monitor's color temperature setting. If necessary, reduce this to the lowest value that can be set (usually 5200 K).

In case of monochrome cameras:

- Images of monochrome cameras are displayed by using overlay colors to represent the colors of fluorescence dyes on the monitor. If the color is different to the visual impression in the eyepiece, select a different overlay color.

8.4 The performance of the camera is not consistent or is too slow

- Generally the performance of the camera is dependent on the performance of the PC. Make sure the PC hardware and setup are optimal for large data transfers.
- Check that the camera is connected to the USB 3.0 interface of the main board (and not USB 2.0) or the recommended USB 3.0 interface card on the PC.
- Make sure no other devices are plugged into the USB 3.0 interface card. This can potentially reduce the speed of the USB 3.0 port.

9 Disposal

The product must not be disposed of as domestic waste or through municipal disposal companies. They 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. The customer is responsible for decontamination.

Info

Detailed information on disposal and recycling is available from your ZEISS Sales & Service Partner.

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