

Instruction Manual
ZEISS Axiovert 5 digital
Inverted Microscope for Routine Microscopy



ZEISS Axiovert 5 digital

Original Manual

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Document Name: Instruction Manual ZEISS Axiovert 5 digital
Order Number: 431030-7021-101
Revision: 3
Language: en-US
Effective from: 01/2023



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1 About this Instruction Manual

This Instruction Manual (further called "document") is considered to be part of the Axiovert 5 digital, herein after referred to as "microscope".

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 microscope.

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

1.1 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 <i>example.pdf</i> in this field.
Anything typed in literally during programming, for example macro codes and keywords.	Enter <code>Integer</code> in the console.
Link to further information within this document.	See: <i>Text Conventions and Link Types</i> [▶ 5].
Link to a website.	https://www.zeiss.com/corporate/int/home.html

1.2 Explanation of Warning Messages and Additional Information

DANGER, WARNING, 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.

DANGER

Type and source of danger

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING**Type and source of danger**

WARNING indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.

⚠ 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.

Info

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

1.3 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



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



WEEE label: Do not discard as unsorted waste. Send to separate collection facilities for recovery and recycling

1.4 Further Applicable Documents

Please take also note of the following documents:

Brochures and Certificates	For brochures, certificates (e.g. ISO, CSA, SEMI), and declarations of conformity (e.g. EU, UK) ask your ZEISS Sales & Service Partner.
Local and National Health and Safety Regulations	Observe local and national health and safety regulations for the location of installation and during the use of the microscope. Consult with your ZEISS Sales & Service Partner if these regulations are in conflict with the installation requirements of the microscope.
Safety Data Sheets	Observe the enclosed safety data sheets. The instructions and guidelines given in the respective safety data sheets must be complied with.
Software	For detailed information on how to use Labscope, please refer to its Online Help or ask your ZEISS Sales & Service Partner.
System and third-party Components, Accessories	Information about the individual components, enhancements, and accessories can be obtained from your ZEISS Sales & Service Partner. Also refer to the documentation of third-party manufacturers.
Instruction Manuals	For detailed information refer to the following Instruction Manuals of: <ul style="list-style-type: none"> ▪ Apple® iPad Pro™ ▪ Microsoft® Surface Pro™

1.5 Contact

If you have any questions or problems, contact your local ZEISS Sales & Service Partner or one of the following addresses:

Headquarters

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Email:	info.microscopy.de@zeiss.com

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Service Germany

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Fax:	+49 7364 20 3226
Email:	service.microscopy.de@zeiss.com

2 Safety

This chapter contains general requirements for safe working practices. Any person using the microscope or commissioned with installation or maintenance must read and observe these general safety instructions. Knowledge of basic safety instructions and requirements is a precondition for safe and fault-free operation. Operational safety of the supplied microscope is only ensured if it is operated according to its intended use.

If any work is associated with residual risks, this is mentioned in the relevant parts of this document in a specific note. When components must be handled with special caution, they are marked with a warning label. These warnings must always be observed.

2.1 Intended Use

Improper use of the microscope and its components can easily lead to impairment of their function or even damage them. Damage caused by incorrect operation, negligence, or unauthorized intervention, in particular by removing, modifying, or replacing parts of the microscope or its components, cannot be held liable by the device manufacturer. Third-party devices or components that are not expressly approved by ZEISS may not be used.

2.1.1 Intended Purpose

The inverted microscopes Axiovert 5 digital are instruments for universal use with integrated mono or color camera. The microscopes were designed for biological applications. The microscopes use eyepiece-less technology. They are prepared for use in combination with a tablet PC. They are suitable for transmitted light brightfield, phase contrast and fluorescence RGB-UV.

It is not intended to either directly or indirectly generate medical diagnostic results.

2.1.2 EMC Information

The EMC performance has been verified as Class 1B for EMI and basic electromagnetic environment for EMS under the standardized configurations. There might be a degradation while an external component/accessory incorporated.

2.1.3 Optical Risk Grouping

According to EN 62471 sources of optical radiation are classified into risk groups subject to their potential photobiological hazard. Sources are classified into the following four groups according to hazard, based on the emission limit as well as permissible exposure time before hazard exceeded.

Risk group	Description
Exempt	No photobiological hazard.
1	No hazard due to normal behavioural limitations on exposure.
2	No hazard due to the aversion response to very bright light sources or thermal discomfort.
3	Hazardous even for momentary exposure.

The following table lists the risk grouping of the available light sources/illumination units according to the mentioned standard:

Light source/Illumination unit	Risk group
Axiovert 5 digital	1 (low risk)

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

2.2.2 Safe Operating Condition

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

The microscope may only be operated after correct installation by a ZEISS service representative and if the operating conditions are adhered to.

- Do not operate the microscope until you have completely read and understood the entire documentation.
- Make sure that all protective cover panels are installed and all warning labels are available and legible.
- Ensure conditions and take measures to prevent the build up of electrostatic charge on the workplace.

2.3 Prevention of Hazards

This section summarizes potential hazards and recommended safety precautions. Failure to follow the safety instructions and instructions may result in personal injury and property damage.

2.3.1 Mechanical Hazards

Crushing Hazards due to Unstable Working Table The toppling and falling of the microscope may cause injuries to the user. Only operate the microscope on a stable working table with a solid and smooth tabletop.

Property Damage due to Transport There is a risk of injury and property damage if the microscope is improperly handled and transported.

- Only use the handle to transport the microscope.

2.3.2 Electrical Hazards

Voltage Hazards Risk of electric shock in case of contact with live parts.

The microscope must be plugged into a properly installed power socket with protective earth contact using the supplied mains cable. The protective earth connection must not be impaired by the use of extension cables.

Safe disconnection from the power supply is only ensured by pulling out the mains plug. The switch on the microscope only switches to standby mode.

Detachable mains supply cords must not be replaced with inadequately rated cords. Always use the power cords supplied by ZEISS. When an unsuitable power cord is used, ZEISS can no longer guarantee the electrical safety and functionality of the microscope.

- Shut down the microscope when not using the microscope.
- Disconnect the power supply before cleaning.
- Set up and operate the microscope so that the connectors are easily accessible.
- Position the microscope in a way so that you can easily unplug the power cable at any time.

2.3.3 Thermal Hazards

Heat Accumulation Covering the ventilation openings can lead to heat accumulation that may damage the microscope and, in extreme cases, can cause a fire.

- Keep ventilation openings unobstructed at all times.
- Do not cover devices or openings emitting heat.
- Do not obstruct ventilation.
- Comply with minimum distance of 30 mm from walls.

2.3.4 Hazards Generated by Radiation

Optical Radiation Hazards LED light sources emit strong optical radiation (e.g. UV, VIS, IR). Optical radiation may cause damage to the skin and eyes. The extent of the damage depends on the parameters such as wavelength, exposure time, mode of operation (continuous or pulsed), etc.

- Avoid exposure of eyes and skin to radiation.
- Do not introduce reflective objects into the beam path.
- Never remove covers or cover panels during operation.
- Do not disable any interlock system elements.
- Use suitable protective equipment / protective clothing if required.

2.3.5 Hazards Generated by Materials and Substances

Biological Hazard Biological substances/agents may pose a risk to the health of humans and other living organisms.

- Keep a logbook of the known biological substances/agents used when working with the microscope and show it to the ZEISS service representative before they perform any work on the microscope.

Hazard of Skin Irritation The immersion fluid can cause skin irritation.

- Avoid any contact with skin, eyes and clothes.
- Read and observe the safety data sheet of the immersion fluid.
- In the event of skin contact, wash the oil off with plenty of water and soap.
- In the event of eye contact, flush eyes with copious amounts of water for a minimum of 5 minutes. See a medical specialist if the irritation persists.

- Disinfectant Hazards** Ensure adequate ventilation in closed rooms. In case of insufficient ventilation, wear respiratory protective equipment. Remove any harmful residue. Allow the device to dry off after disinfection, particularly after disinfection of eyepieces. Do not inhale vapors. When using disinfectants, do not eat, drink or smoke. Avoid contact with eyes and skin. Remove contaminated clothing and wash before reuse.
- Infection Hazards** Direct contact with the eyepieces can be a potential way of passing on bacterial and viral infections.
- The risk can be lowered by using personal eyepieces or eyecups. If eyepieces need to be disinfected frequently, ZEISS recommends to use the eyepieces without eyecups.
 - To avoid infections, the use of personal protective equipment (PPE), e.g. gloves, for operation, cleaning, and decontamination is highly recommended. Disposable gloves can be decontaminated with alcohol for example, if necessary, or should be changed frequently to minimize the risk of contamination.
- Consumable Hazards** Incorrect handling of consumables and cleaning agents can lead to property damage or skin and eye injuries. Consumables that are not approved by ZEISS can lead to property damage. Consult your ZEISS Sales & Service Partner to learn what consumables you can order and how to handle them.
- Hazardous Substances** The microscope and other components can come into contact with various specimens and substances that can be hazardous to humans and the environment. The microscope is not equipped with special equipment protecting it from corrosive, potentially infectious, toxic and radioactive or other samples that may be hazardous to health.
- Make sure that the microscope was not in contact with hazardous substances (check the laboratory logbook); otherwise, the microscope must be cleaned/decontaminated/disinfected.
 - Check the components also. If necessary, clean the components as meticulously as possible. Label contaminated/infected components that cannot be properly cleaned.
 - Contaminated parts shall not be returned to any ZEISS department. Decontaminated parts can be sent to ZEISS accompanied by a signed „Customer Declaration of Decontamination“.
 - Wear gloves.
 - Observe all legal requirements, in particular the relevant national accident prevention regulations.

2.3.6 Hazards Generated with the Operating Environment

- Dirt, Dust, and Moisture** Dirt, dust, and moisture can impair the microscope's functionality.
- Shut down the microscope whenever it is not used and cover it with a dust protection cover.
 - Always cover unused openings/ports.
 - Perform regular maintenance and cleaning according to the instructions in this manual.
 - Make sure that no cleaning liquid or moisture gets inside the microscope.
 - Make sure that the electrical parts never come into contact with moisture.
 - Never expose the microscope to inadmissible climate conditions (high humidity and temperature).
- Explosive Atmosphere** Fire hazard due to explosive or flammable environment.
- Do not operate the devices included in the scope of delivery in a potentially explosive atmosphere, in the presence of volatile anesthetics or flammable solvents such as alcohol, petrol or similar substances.

2.4 Labels and Lights

This chapter shows labels and, where applicable, indicator lights.

All parts that may pose specific hazards are marked with warning labels.

Always observe **all** warning labels!

- Check all warning labels for availability and legibility.
- Immediately replace damaged or illegible warning labels.

In case a label is missing please contact your ZEISS service representative for free of charge replacement.

2.4.1 Labels and Lights on the Axiovert 5 digital

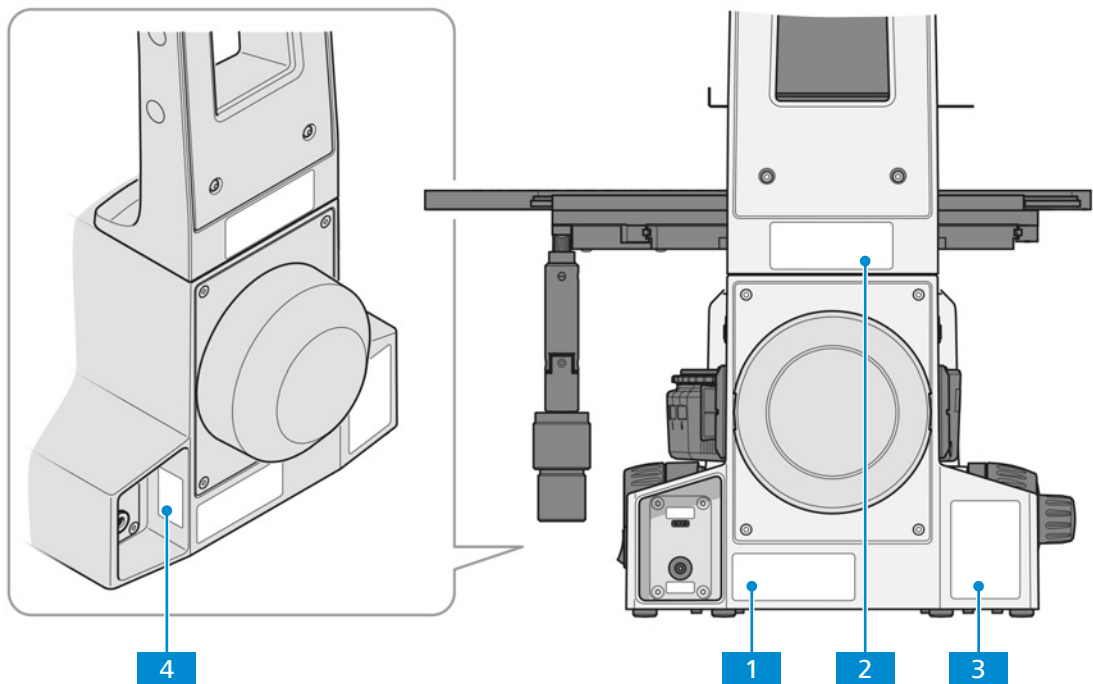


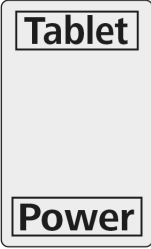



Fig. 1: Position of warning labels on Axiovert 5 digital

Pos.	Label or light	Explanation
1		Type label

Pos.	Label or light	Explanation
2		Conformity label
3		EU representative label
4		Socket label: Tablet/Power
*		EU representative and importer label * Label is placed on the microscope packaging.

2.5 Safety Devices and Interlocks

In order to prevent injuries and/or property damage, the microscope is equipped with several safety devices and interlocks. In case of defect or damage, the affected parts and the microscope must be taken out of operation immediately and must be secured against unintentional use.

To verify the safety of the microscope, contact your ZEISS service representative and keep the service logs and logbooks.

3 Product and Functional Description

The Axiovert 5 digital is a transmitted-light and reflected-light microscope of compact design with a small footprint. The microscope provides high resolution, infinity-corrected objectives for the transmitted-light techniques brightfield, and phase contrast microscopy and for the reflected-light technique fluorescence.

The microscope is to be used with a tablet PC from Apple®¹ or Microsoft®².

Typical applications

- Biological examinations in laboratories (research) and hospitals
- Science and research (colleges, universities) in biological fields
- Observe blood and tissue samples of the human body

Info

For additional information and detailed descriptions, refer to further applicable documents or ask your ZEISS Sales & Service Partner.

¹Apple®, iPad Pro™ and iOS® are registered trademarks of Apple Inc.

²Microsoft®, Surface Pro™ and Windows are trademarks of the Microsoft group.

3.1 Main Components of Axiovert 5 digital

Purpose This section shows the main components of Axiovert 5 digital.

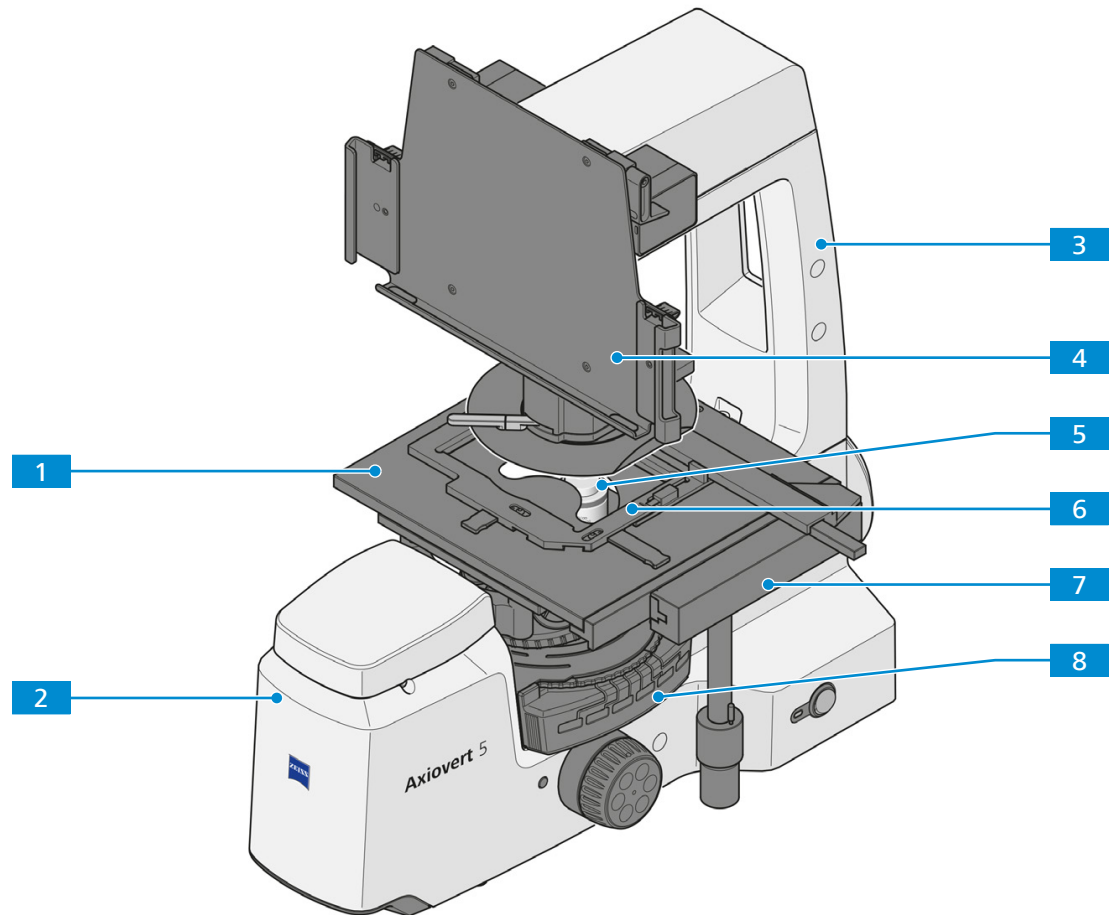


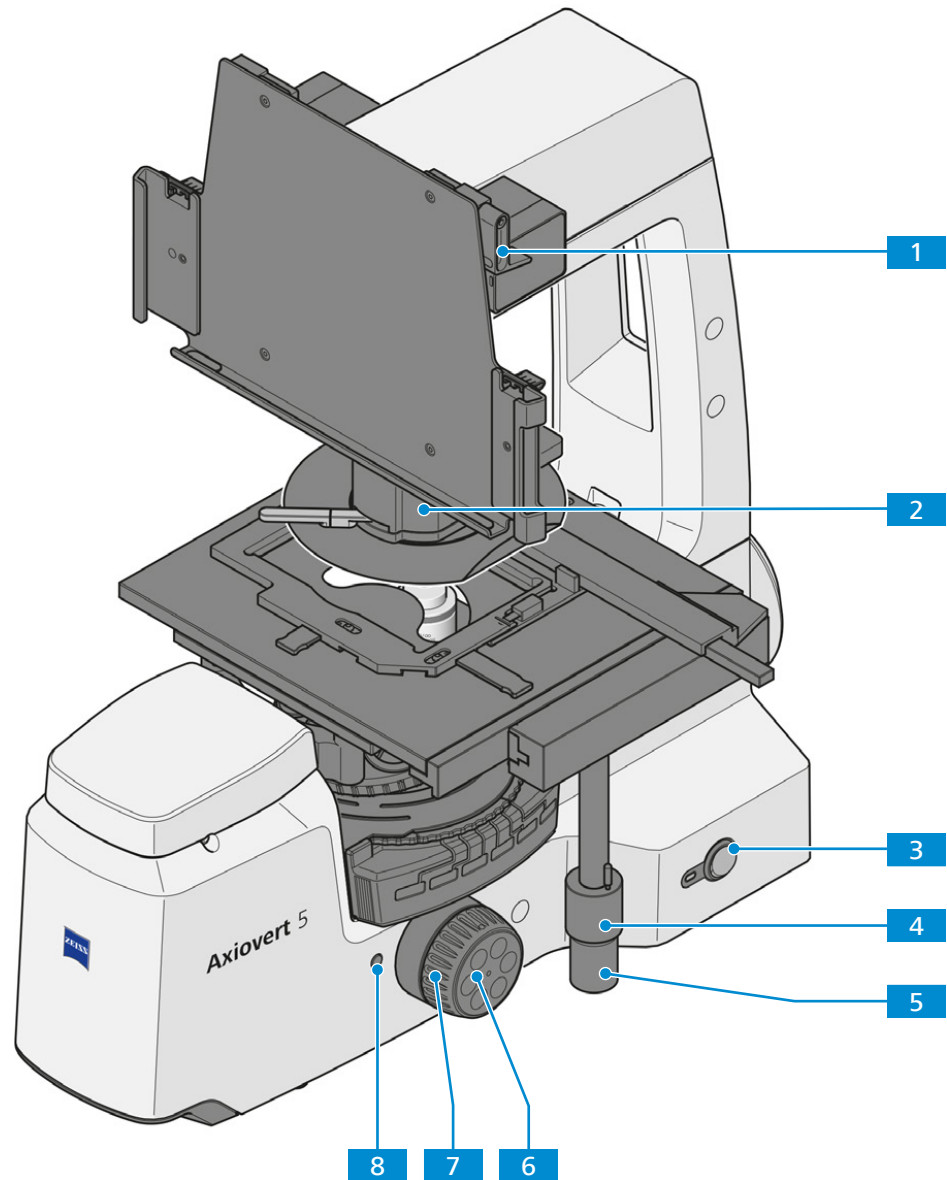
Fig. 2: Main components

- | | |
|--|--|
| 1 Specimen stage [▶ 20] | 2 Stand |
| 3 Carrier transmitted-light illumination with white LED 10W | 4 Holder for tablet |
| 5 Nosepiece with objectives [▶ 19] | 6 Mounting frame M |
| 7 Object guide | 8 Reflector turret [▶ 21] |

3.2 Controls and Functional Elements on Components

3.2.1 Front Side of the Stand

This section shows the functional components and controls.



- | | |
|--|---|
| 1 Anti-theft device | 2 Condenser |
| 3 Power switch On/Off with <i>power indicator</i> [▶ 18] | 4 Coaxial knurled knob for Y adjustment |
| 5 Coaxial knurled knob for X adjustment | 6 Focusing drive – fine adjustment |
| 7 Focusing drive – coarse adjustment | 8 Snap button (right and left side) |

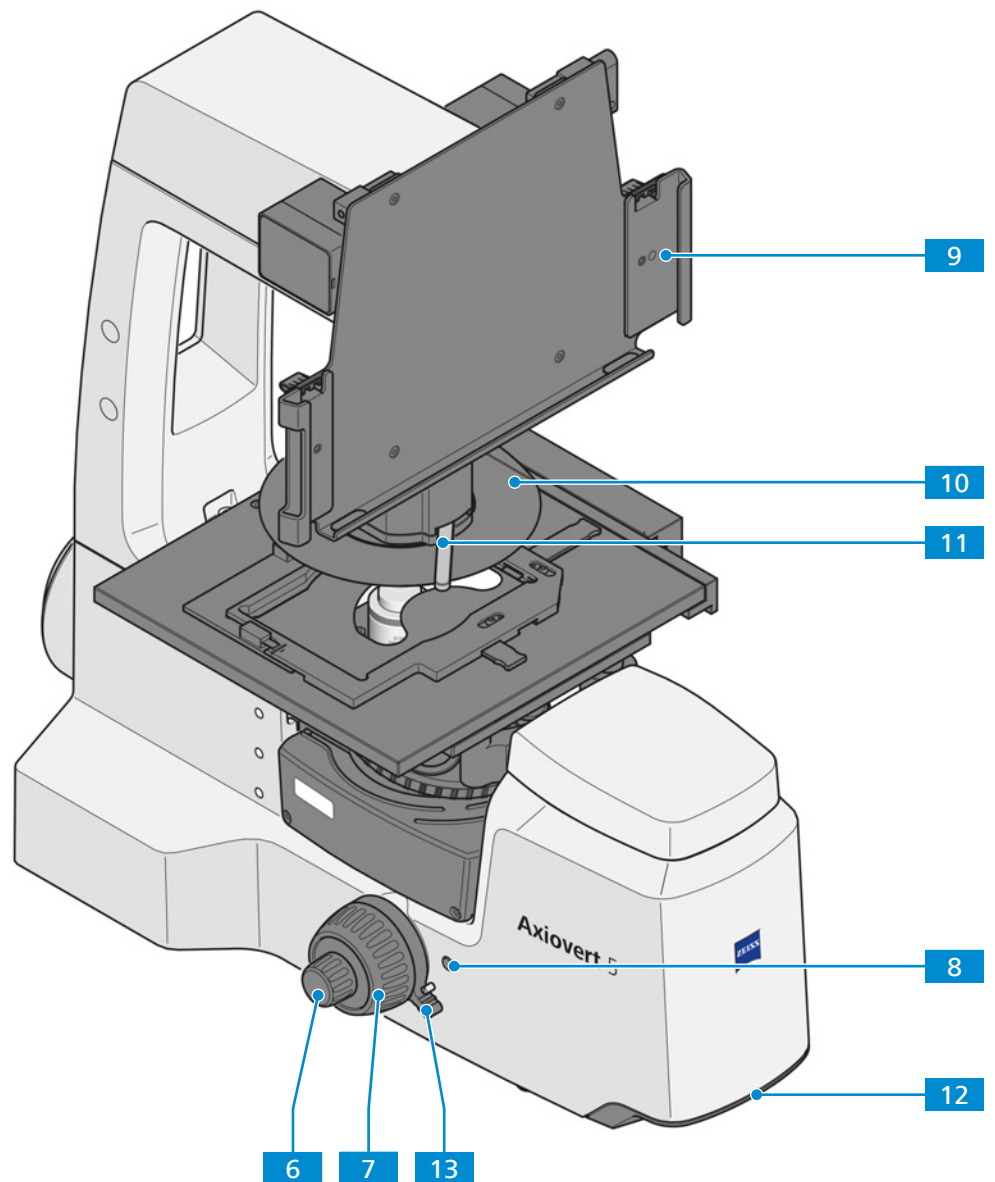


Fig. 3: Controls and functional elements

- | | |
|--|---|
| 6 Focusing drive – fine adjustment | 7 Focusing drive – coarse adjustment |
| 8 Snap button (right and left side) | 9 Tablet handles |
| 10 Light shield | 11 Contrast lever |
| 12 Carrying handle | 13 Release lever for adjustable focus stop |

3.2.2 Rear Side of the Stand

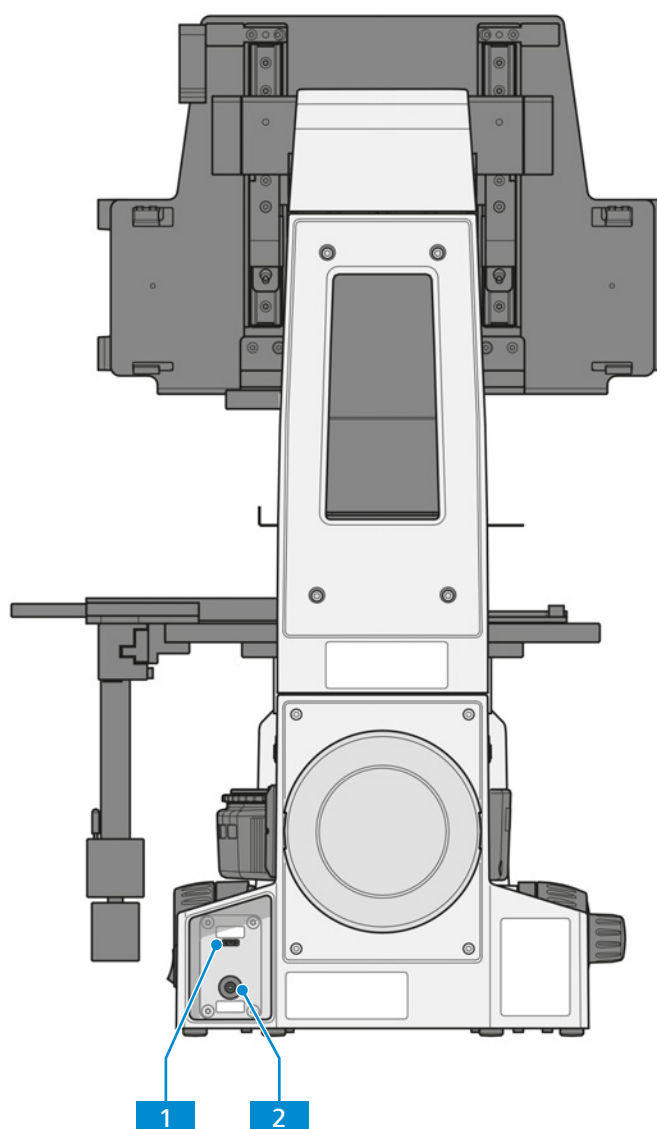


Fig. 4: Controls and functional elements on the rear side

- 1** Tablet socket (USB 3.0 Type C socket) **2** Power socket

3.2.3 Power Indicator

Function The power indicator indicates the current state of the microscope with the following states:

Color	State	Status
blue	continuously	The microscope is being initialized.
green	continuously	The microscope is ready for operation.
red	continuously	An error has occurred during update or initialization.
red	flashing	An update of the smartbox is running.
none	off	The microscope is powered off.

3.2.4 Nosepiece with Objectives

Purpose The nosepiece is used to hold the objectives and to swivel the desired objective into the beam path.

Position The nosepiece is mounted on the lower part of the stand.

The following features and controls are available:

- encoded nosepiece with M27 mounting thread for six objectives

The following objectives are installed:

- Pos. 1: Objective LD A-Plan 5x/0.15 Ph1 M27 (FWD = 11.7 mm at CG = 1 mm polystyrene)
- Pos. 2: Objective LD A-Plan 10x/0.25 Ph1 M27 (FWD = 8.5 mm at CG = 1 mm polystyrene)
- Pos. 3: Objective LD A-Plan 20x/0.35 Ph1 M27 (FWD = 4.9 mm at CG = 1 mm polystyrene)
- Pos. 4: Objective LD A-Plan 40x/0.55 Ph1 M27 (FWD = 2.3 mm at CG = 1 mm polystyrene)

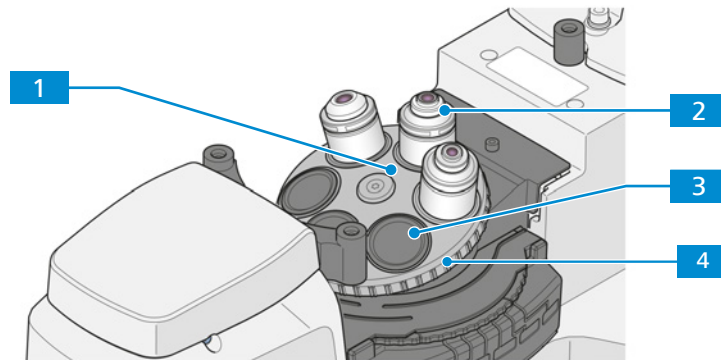


Fig. 5: Nosepiece with objectives

- | | | | |
|----------|-----------|----------|--|
| 1 | Nosepiece | 2 | Objective |
| 3 | Cover cap | 4 | Knurled ring for swivelling the nose-piece |

3.2.5 Objective Labeling

Purpose The objective is a light collecting optical system.

Position The objective is screwed into the nosepiece.

The selection of objectives co-determines the fields of use that the microscope can reasonably cover.

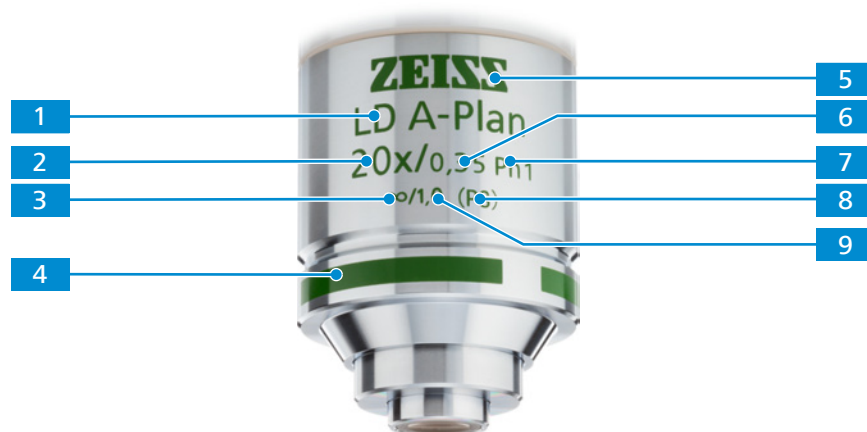



Fig. 6: Objective labeling

Pos.	Designation	Value (example)
1	Objective class	e.g. LD A-Plan, Plan-Apochromat, Fluor
2	Magnification	
3	Optical System	ICS- Optic ∞
4	Color coding of scale number	See 2.
5	Contrast method	Black = Standard Red = Pol/DIC Green = Ph 0, Ph 1, Ph 2, Ph 3
6	Numerical Aperture	e.g. 0.25
7	Application	<ul style="list-style-type: none"> Immersion Medium (Oil / W/ Glyc) Adjustable cover glass correction (Corr.) Contrast method. See 5.
8	Designed for polystyrene	(PS)
9	Cover glass thickness (mm)	e.g. 1.0

3.2.6 Specimen Stage 232x230

Purpose Mechanical stages are used for fixing and positioning the sample for examination.

Position The mechanical stages are mounted directly onto the stand.

Function The sample is positioned in the beam path by means of a coaxial drive in X and Y direction. The adjustment range can be read off the respective vernier scale.

After installing the object guide to the specimen stage, the following components can be installed additionally to fix the samples:

- mounting frame Flex M
- mounting frame inserts for Petridishes
- mounting frame inserts for slides and chambers

The following features and controls are available after attaching the object guide:

- dimension 232x230 mm
- travel range 130x85 mm
- coaxial drive for X and Y adjustment

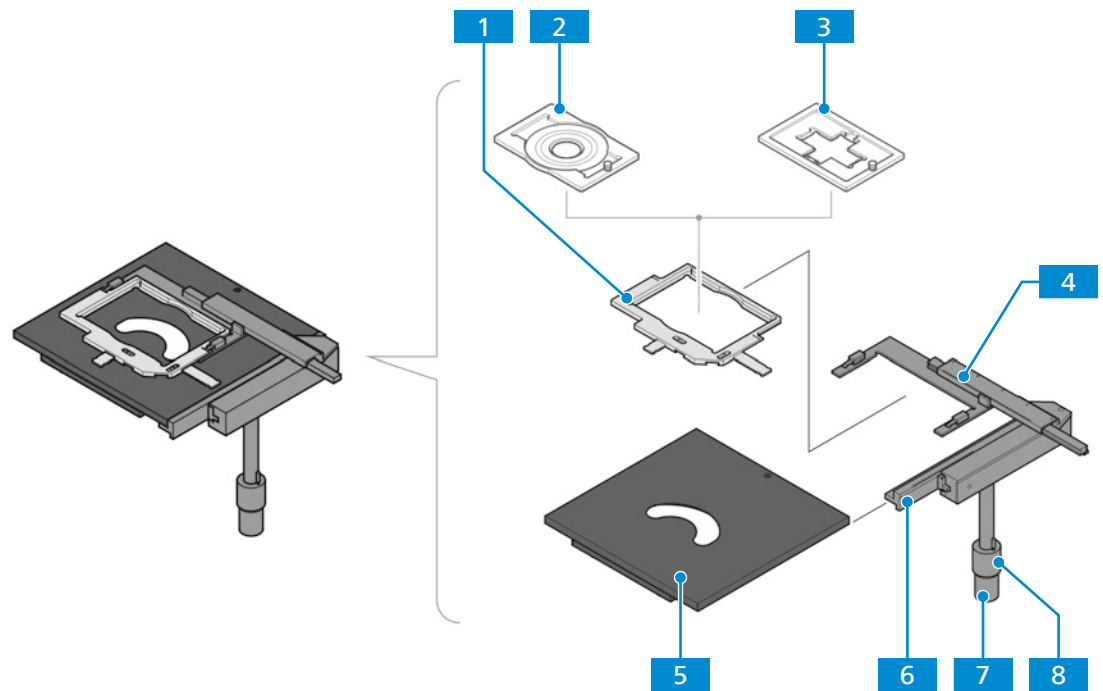


Fig. 7: Specimen stage 232x230 and object guide M 130x85 mm

- | | | | |
|----------|---|----------|---|
| 1 | Mounting frame Flex M | 2 | Mounting frame insert Flex M, petridishes |
| 3 | Mounting frame insert Flex M, slides and chambers | 4 | Vernier scales for display of the adjustment range in X and Y |
| 5 | Specimen stage 232x230 | 6 | Object guide M 130x85 mm R/L |
| 7 | Coaxial drive; knurled knob for X adjustment | 8 | Coaxial drive; knurled knob for Y adjustment |

3.2.7 6-Position Reflector Turret, Encoded for P&C Modules

Purpose The reflector turret is used to hold the push-and-click (P&C) reflector modules and to swivel the desired reflector module into the beam path.

Position The reflector turret is fixed to the stand below the nosepiece.

Function Rapid reflector change by rotating the reflector turret wheel. The activated reflector is marked by a line on the right of the reflector turret cover.

The reflector turret is configured as follows:

- Pos. 1: empty for transmitted light bright field illumination
- Pos. 2: Filter Set 90 HE LED with Reflector Module FL EC P&C

For further information, see *Accessories and Optional System Expansions* [▶ 46].

3.3 Microscopy and Contrast Techniques

The availability of microscopy and contrast techniques depends on the microscope type and the configuration.

3.3.1 Transmitted Light Brightfield Microscopy

Transmitted light (TL) brightfield microscopy is the most common of all optical microscopy methods, since it can be used to quickly and easily examine high-contrast or stained samples (e.g. blood smears).

In order to obtain an image as close as possible to the object, not only the so-called direct beam bundles but also the indirect ones, i.e. the beam bundles diffracted and scattered at the preparation details, are of essential importance. According to ABBE, the larger the indirect beam components are, the more true to the object the microscopic image is.

3.3.2 Transmitted Light Phase Contrast Microscopy

The phase contrast method is ideal for examining thin uncolored samples, e.g. individual cells of cell cultures. Generally, the human eye cannot detect phase differences (variations in refractive index or thickness) within the different cell components.

The phase contrast method uses the optical modulators "annular phase diaphragm" and "phase ring" to convert the small phase differences in intensity differences which are visible to the human eye. The interference of different beams in the intermediate image is important for the generation of such images.

With the aid of the optically defined ring channel "annular phase diaphragm and phase ring", the bright direct light portions are attenuated and provided with a constant phase shift. The indirect light portions, however, which are diffracted by different cell particles, bypass this optical channel and their phase is affected by the difference in the sample's refractive index and thickness.

In the intermediate image plane, the partial beams are thus differently affected and achieve interference and strengthen or weaken each other (constructive and destructive interference) – depending on their phase. As a result, these interferences create image contents with intensity differences visible to the human eye.

3.3.3 Reflected Light Fluorescence Microscopy

The reflected light fluorescence method is used to show fluorescent substances in typical fluorescent colors in high contrast. The light originating from a high-performance light source in a reflected light fluorescence microscope passes through a heat protection filter onto an excitation filter (bandpass). The filtered short-wave excitation radiation is reflected by a Dichroic Beam splitter and is focused on the sample through the objective. The sample absorbs the short-wave radiation before emitting longer-wave fluorescence radiation (Stokes' Law). This radiation is then captured from the image side by the objective and passes through the Dichroic Beam splitter. Last, the beams pass through an emission filter (longpass/bandpass) and only the long-wave radiation emitted by the sample passes.

The spectra of the excitation and the emission filter must match very closely. They must be inserted in a Reflector Module FL EC P&C reflector module together with the according Dichroic Beam splitter.

4 Installation

Perform only the installation work described in this document. All other installation work not described may only be carried out by an authorized ZEISS service representative.

4.1 Installing the Labscope Software

For Windows

1. Scan the QR code to download the latest version of Labscope software.



2. Double-click on **labscope_vX_setup.exe**.
 3. Perform the required steps shown by the installation wizard.
 4. If you are asked, agree to install additional drivers.
- ↳ After the installation the Labscope program icon is shown on your tablet PC.

More information can be found in the Labscope instruction manual.

For iOS® The Labscope apps for iOS® can be downloaded via the App Store®. You can download the corresponding app for your tablet PC directly from there.

Please visit our product website (<https://www.zeiss.com/labscope>) to find the links for download.

4.2 Unpacking and Setting up the Microscope

- Procedure**
1. Open the packaging.
 2. Take the microscope, all assemblies, and accessories out of the packaging.
 3. Check them for completeness as per delivery note.
 4. Check all parts for damaging.
 5. Place the microscope on a vibration-free, level, and non-inflammable surface.

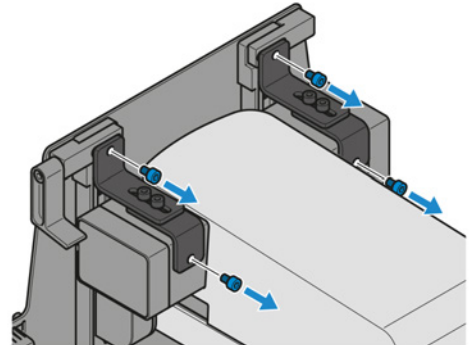
It is recommended to keep the original packing and store it away for later use, e.g. for stowing the microscope during periods of non-use or for returning the microscope to the manufacturer for repair.

4.3 Removing the Transportation Lock

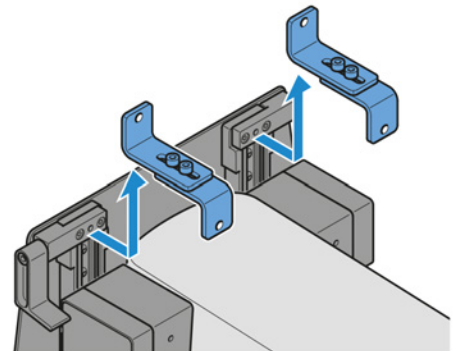
Parts and Tools  Hex Key, 3.0 mm

Prerequisite  The microscope is unpacked (see *Unpacking and Setting up the Microscope* [[▶ 23](#)]).

Procedure 1. Loosen two screws on each transportation lock.




2. Remove the transportation locks.



4.4 Assembling the Tablet PC

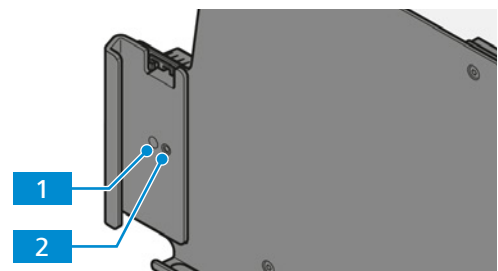
Parts and Tools  Hex Key, 2.5 mm

Prerequisite  The microscope is *unpacked* [[▶ 23](#)].

 The transportation lock is *removed* [[▶ 24](#)].

Procedure 1. Attach the tablet handles to the tablet holder. Observe the positions:

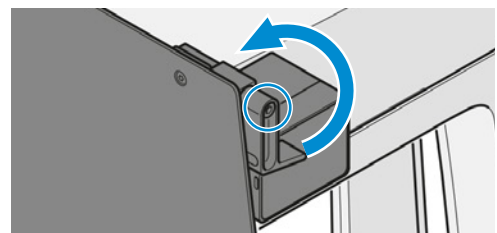
- **1** for Microsoft® Surface Pro™
- **2** for Apple® iPad Pro™.



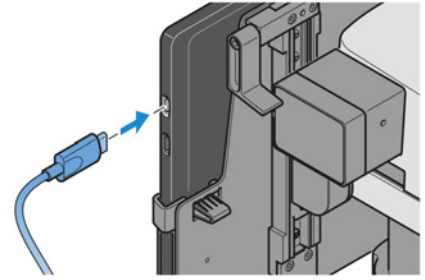
2. Put the tablet PC on the tablet holder.

3. **NOTICE** The anti-theft device can cause scratches on the tablet PC. To avoid scratches its screw may only be fixed loosely.

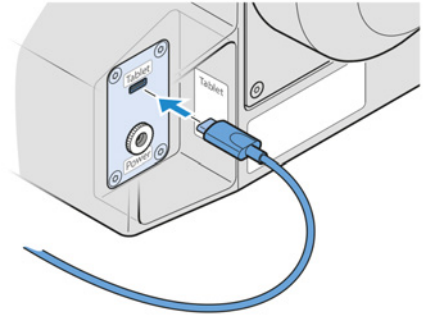
Turn the anti-theft device down and fix its screw.



4. Connect the USB type C cable to the tablet PC.

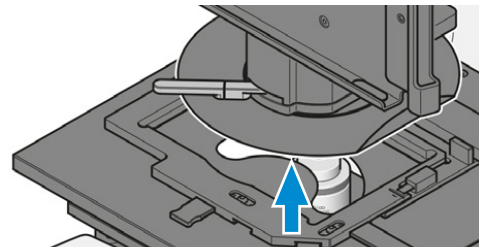


5. Connect the USB type C cable to the **Tablet** socket (USB 3.0 Type C socket).



4.5 Assembling the Light Shield

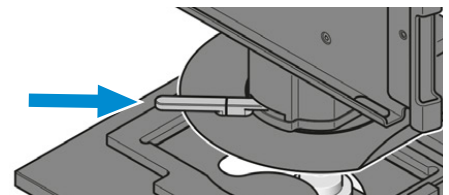
- Procedure**
1. Hold the light shield with the kinked piece facing upwards.
 2. Attach the light shield to the condenser.
→ The light shield is held by magnets.



3. Adjust the light shield to the indicated position marked on it.

4.6 Assembling the Contrast Lever



- Procedure**
1. Hold the contrast lever with the pin facing downwards.
 2. Attach the contrast lever to the condenser.



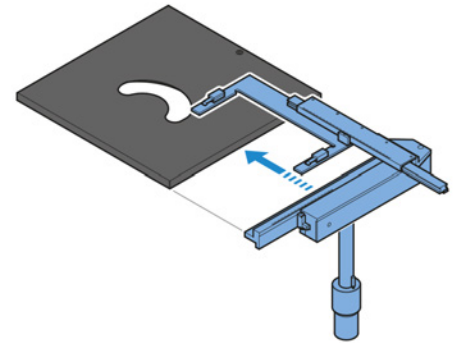
4.7 Assembling the Object Guide and Mounting Frame to the Stage

Info

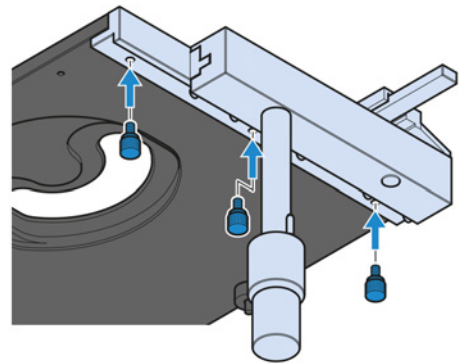
The object guide can be mounted to the right or to the left side of the stage.

- Parts and Tools**
-  Mounting frame Flex M
 -  Mounting frame insert Flex M

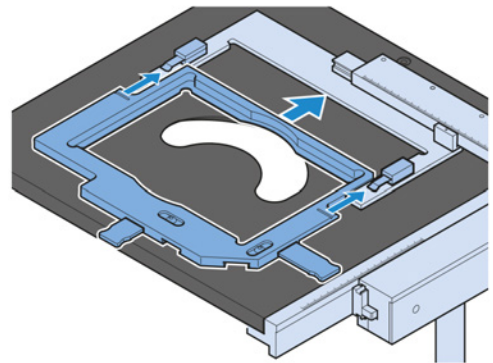
- Procedure**
1. Set the object guide onto the stage.



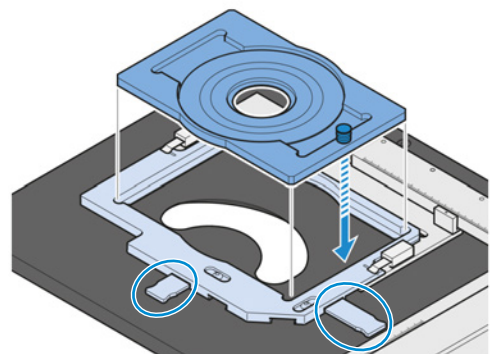
2. Tighten the three knurled screws to fix the object guide from below.



3. Slide the mounting frame into the object guide until it snaps into place.



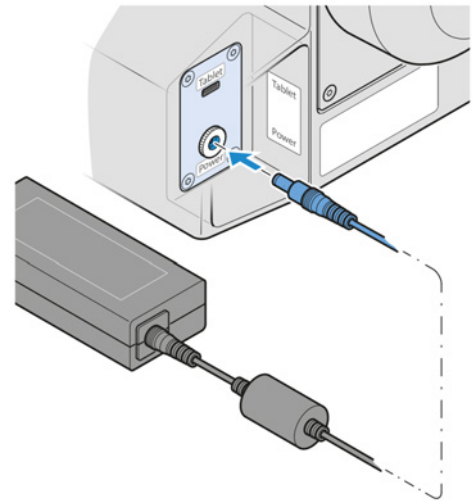
4. If required, put a mounting frame insert onto the mounting frame and fix it with the sliders.



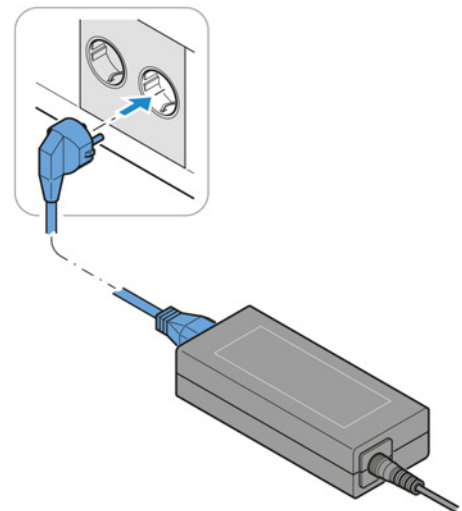
4.8 Connecting the Microscope to the Mains

Prerequisite ✓ The microscope is switched off.

Procedure 1. Connect the power cable to the **Power** socket.



2. Connect the power cable to the mains.



4.9 Assembling Objectives

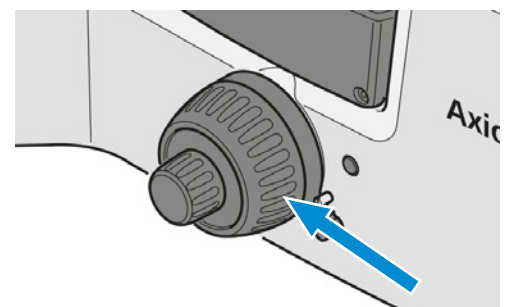
NOTICE

Dust-sensitive components

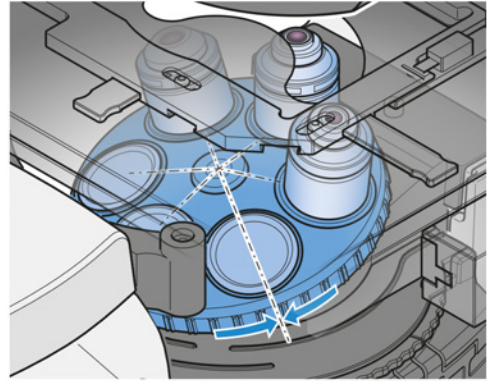
If unused nosepiece openings remain uncovered, particles may enter the microscope and may damage its optics and mechanics permanently.

- ▶ Always close unused nosepiece openings with cover caps!

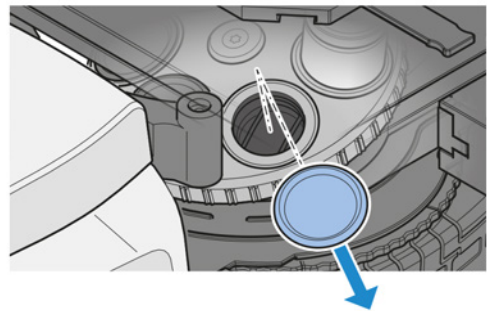
Procedure 1. Fully lower the nosepiece by turning the coarse adjustment knob clockwise.



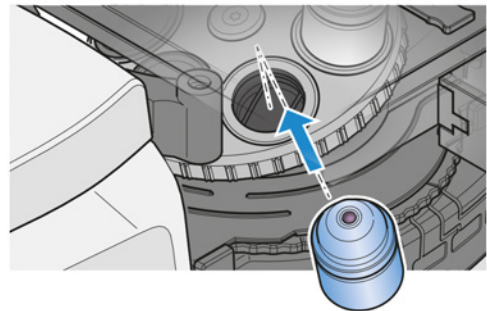
2. Turn the nosepiece until the relevant objective position is on the right side.



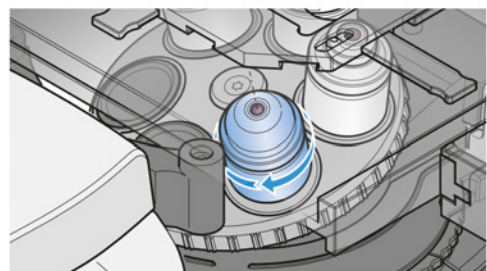
3. Remove the cover cap or screw out the present objective from the nosepiece's relevant opening.



4. Take the objective out of its case.
5. Position the objective in the opening of the nosepiece.



6. Carefully screw the objective into the opening. Make sure it engages properly in the nosepiece's thread.

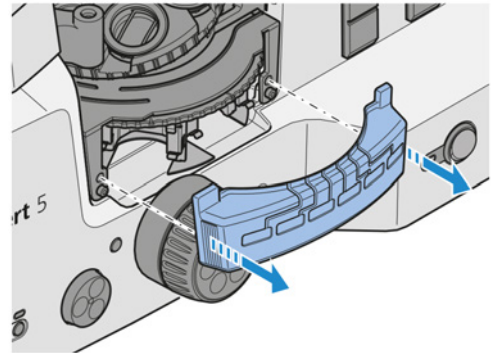


Proceed in the reverse order for removal.

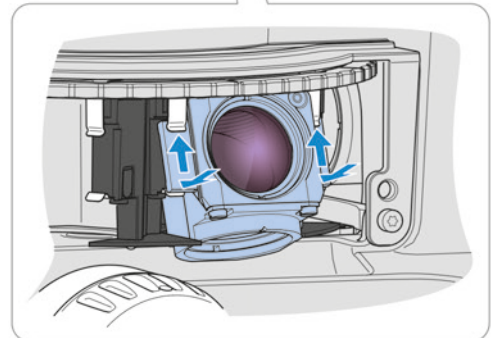
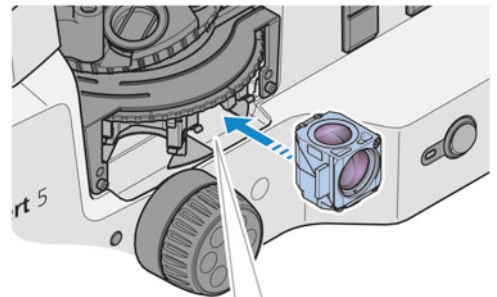
4.10 Assembling Reflector Modules

To ease the use and the recovery of reflector modules, the modules should be installed to defined positions. The turret positions' numeric markings can be used to identify the modules.

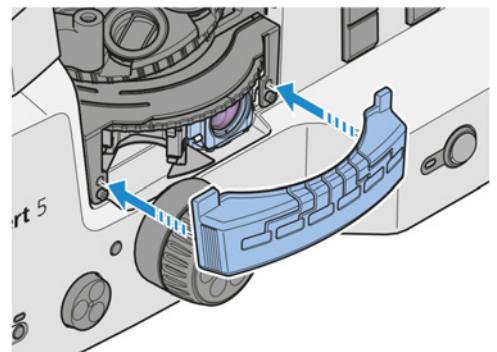
Procedure 1. Remove the protective cover.



2. **NOTICE** Avoid touching optical surfaces. Carefully grab the module to be installed so that the excitation filter points away from the turret center and the screws point downwards.



3. Tilt the module away from the turret.
4. Press the upper edges of the module's retaining elements to the turret position's upper spring clips.
5. Push the modules lower edge towards the turret's center, so the retaining elements snap in to the lower spring clips.
6. Re-install the protective cover.



7. Stick the adhesive labels specifying the filter combinations utilized for each reflector turret position to the spaces provided on the protective cover.

Proceed in the reverse order for removal.

5 Operation

This chapter describes switching on/off the microscope as well as the operating steps with the microscope.

Info

For additional information and detailed descriptions, refer to further applicable documents or ask your ZEISS Sales & Service Partner.

Info

Further information on the software and its operation is available in the software's online help.

5.1 Prerequisites for Commissioning and Operation

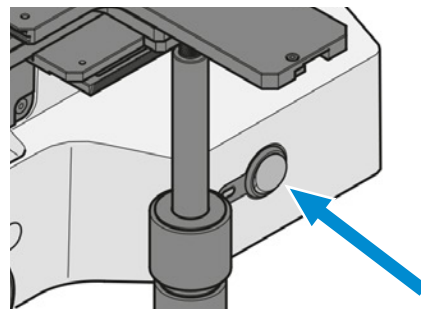
The following basic prerequisites are necessary for commissioning and operation:

- The Instruction Manual was read prior to commissioning or operation and kept for further use.
- The chapter **Safety** was read and understood.
- When using a Microsoft® Surface Pro™: The operator is acquainted with the general Windows-based programs.
- When using an Apple® iPad Pro™: The operator is acquainted with the general iOS®-based programs.
- If required: Basic training and safety briefing were successfully completed.

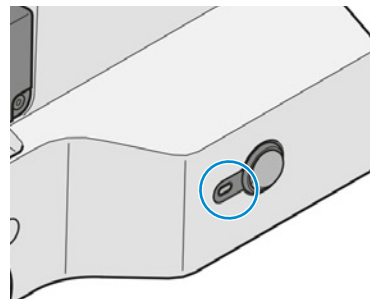
5.2 Switching On the Microscope

Prerequisite ✓ *The microscope is connected to the mains [▶ 27].*

Procedure 1. Set the **Power** switch to position **I**.



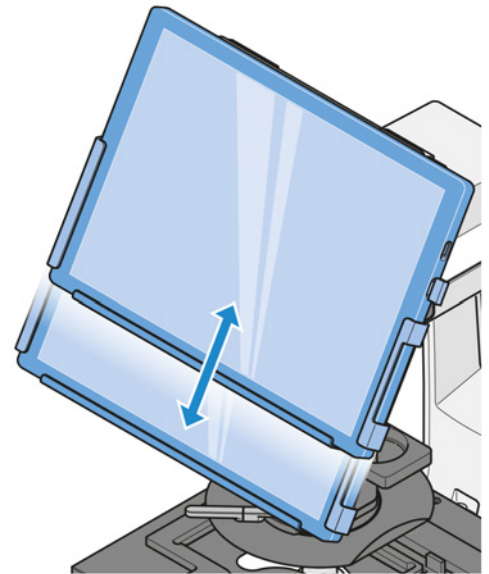
- The power indicator lights up with blue light.
- When the initialization is finished, the indicator turns to green light.



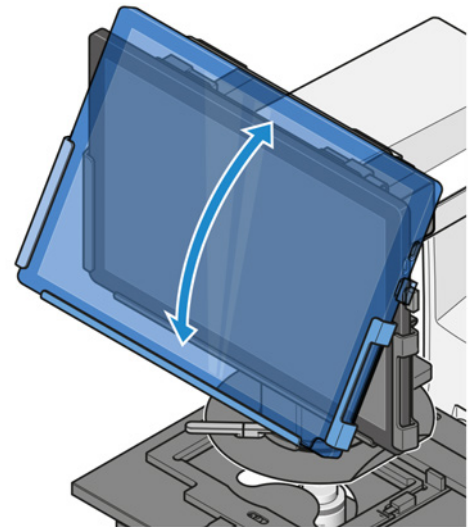
2. Switch on the tablet PC.
 3. Open the Labscope software.
 4. Follow the instructions given in the Labscope Online Help.
- ↳ The microscope is operational.

5.3 Adjusting the Tablet Holder

- Procedure**
1. Set the viewing height by moving the tablet holder upwards or downwards.



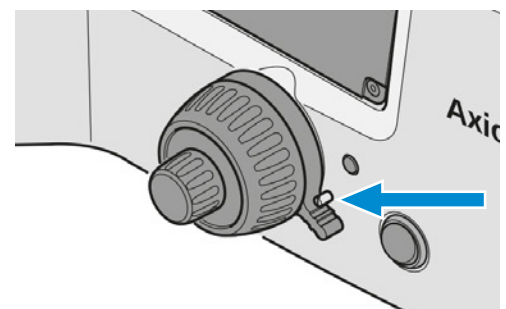
2. Set the viewing angle by swiveling the tablet holder.



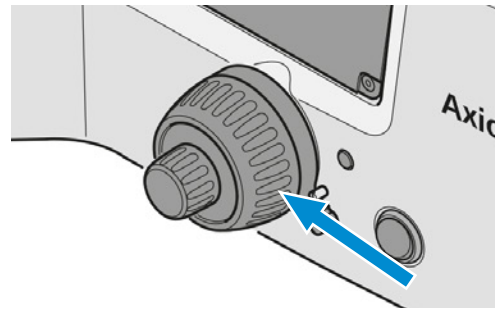
5.4 Adjusting the Adjustable Focus Stop

- Prerequisite**
- ✓ The microscope is operational.
 - ✓ A sample is positioned on the stage.

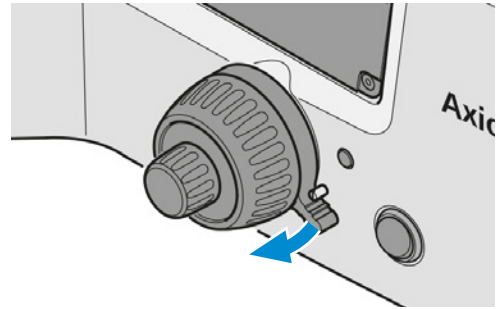
- Procedure**
1. Rotate the clamping lever of the stop upwards to the stop pin.



- Carefully, move the nosepiece to the required upper position. Use the focusing drive.



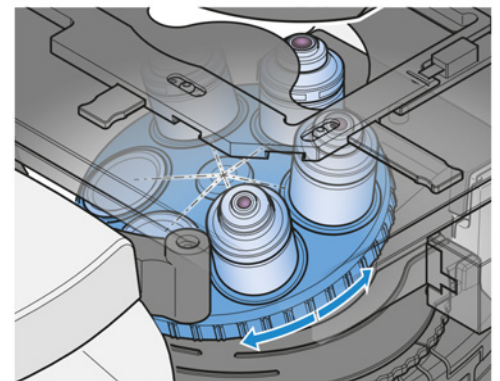
- Press the clamping lever downwards to lock the stop position.



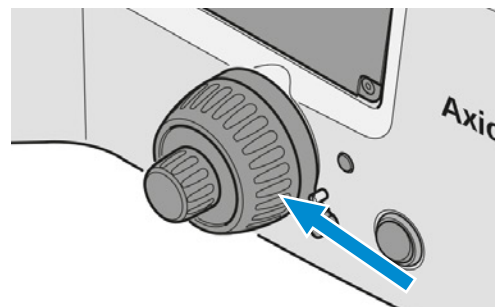
5.5 Operation during Experiments

Prerequisite ✓ The microscope is operational.

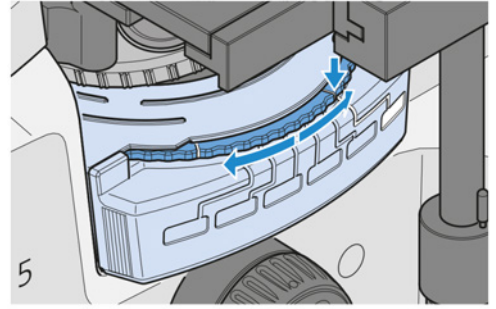
- Procedure**
- Place the sample on the stage.
 - Select the required objective.



- Focus the sample.

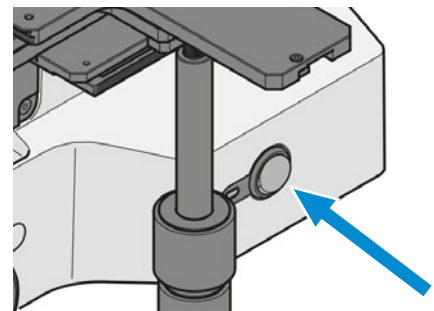


4. If applicable, rotate a reflector module on the reflector turret into the beam path. Watch for the correct locking position.



5.6 Switching Off the Microscope

- Procedure**
1. Close the Labscope software.
 2. Switch off the tablet PC.
 3. Set the **Power** switch to position **O**.



4. Cover the microscope with the dust cover.

6 Care and Maintenance

To ensure the best possible performance of the microscope, maintenance must be performed on a regular basis. Please keep the service logs for your microscope.

To maintain operational safety and reliability of the microscope, we recommend entering into a **ZEISS Protect Service Agreement**.

Info

For additional information and detailed descriptions, refer to further applicable documents or ask your ZEISS Sales & Service Partner.

6.1 Safety During Cleaning and Maintenance

Only conduct preventive measures described here. All tasks of maintenance and cleaning not described may only be performed by an authorized ZEISS service representative.

Any unauthorized intervention or any operation outside the scope of the intended use can lead to injuries and property damage and voids all rights to warranty claims. Only original spare parts from ZEISS may be used.

NOTICE

Property damage due to short circuit

When the microscope is still switched on, coming in contact with electronic parts can lead to a short circuit.

- ▶ Switch off the microscope prior to opening or cleaning.
- ▶ Disconnect live parts from the power supply.

NOTICE

Functional impairment due to dirt and moisture

Dirt, dust and moisture can impair the microscope functionality and can cause short-circuits.

- ▶ Use the dust protection cover if the microscope is not used.
- ▶ The ventilation slots must be unobstructed at all times.
- ▶ Perform regular maintenance and cleaning according to the instructions in this document and according to the instructions in the applicable documents.
- ▶ Make sure that no cleaning liquid or moisture gets inside the microscope.
- ▶ In case of damage, the affected parts of the microscope must be taken out of operation.

6.2 Maintenance Schedule

The recommended intervals for maintenance depend on the total uptime of the microscope.

Interval	Part/Component	Activity
daily	-	<p>Check the power cable and each plug for possible damage.</p> <p>If any damage is observed, turn the instrument off and secure it against inadvertent restarts immediately. Call in a qualified professional to remedy the problem.</p>

Tab. 1: Maintenance Plan

6.3 Maintenance Work

6.3.1 Cleaning an Optical Surface

NOTICE

Damage of optical surfaces due to improper cleaning

- ▶ Remove dust from the optical surface slowly and carefully.
- ▶ Remove dust on optical surfaces with a natural-hair brush or blow it off with a rubber bellows.
- ▶ Avoid touching optical surfaces with fingers.

- Parts and Tools**
- 🔧 Clean cloth
 - 🔧 Cotton swab
 - 🔧 Optical cleaning solution (85% n-hexan and 15 vol% isopropyl alcohol (IPA))
 - 🔧 Lint-free cloth

- Procedure**
1. Moisten a cotton swab or a clean cloth with an optical cleaning solution, if necessary.
 2. Wipe optical surfaces in a circular motion towards the edge of the optics with slight pressure.



WRONG

CORRECT

3. Dry with a lint-free cloth.

6.3.2 Removing Water-Soluble Contamination

- Parts and Tools**
- 🔧 Clean cloth
 - 🔧 Lint-free cloth

- Procedure**
1. Moisten a clean cloth with water.
 - A mild detergent may be added to the water (no solvent!).
 2. Wipe off the area with the cloth.
 3. Dry with a lint-free cloth.

6.3.3 Replacing the LED modules

⚠ CAUTION

Burning hazard due to hot light sources

Light sources can become hot during processing.

- ▶ Avoid touching the hot light source housing.
- ▶ Let the light source cool down before touching it.

⚠ CAUTION

Eye damage or skin irritation due to hazardous light emission

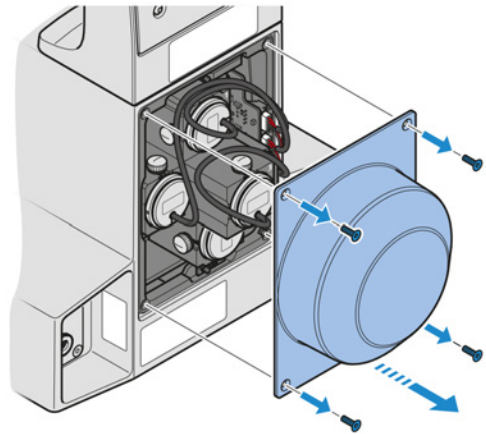
The light source emits LED radiation and UV radiation. Eye damage or skin irritation may result from exposure.

- ▶ Never look directly into the light-emitting aperture of the light source.
- ▶ Avoid exposure of skin to the radiation. Use suitable protective equipment/protective clothing if required.
- ▶ Before installing or removing the light source always make sure it is switched off.

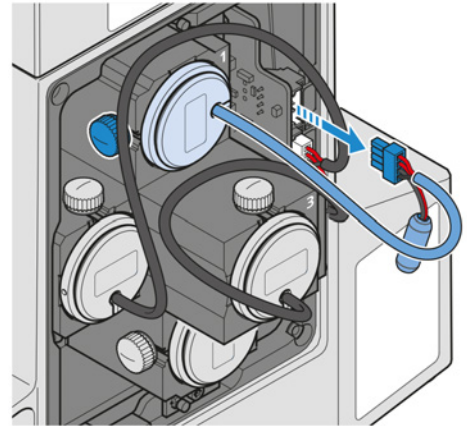
- Parts and Tools**
- 🔧 Hex Key, 2.0 mm
 - 🔧 Suitable LED module

- Prerequisite**
- ✓ The microscope is switched off.
 - ✓ The microscope is unplugged from mains power.

- Procedure**
1. Loosen the four screws on the rear cover.
 2. Remove the cover.

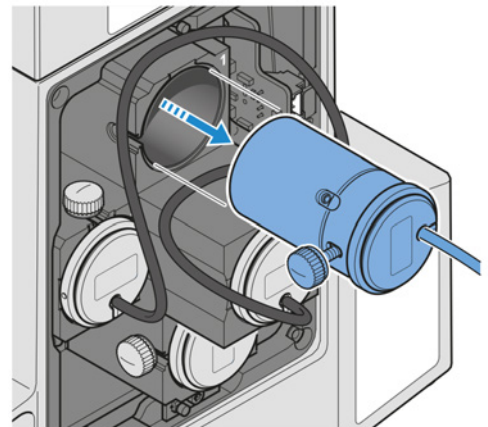


3. Unplug the connector of the defective LED module.

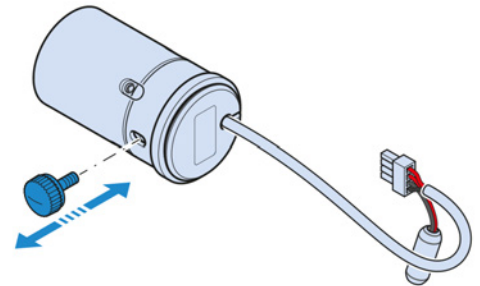


4. Loosen the knurled screw of the defective LED module.

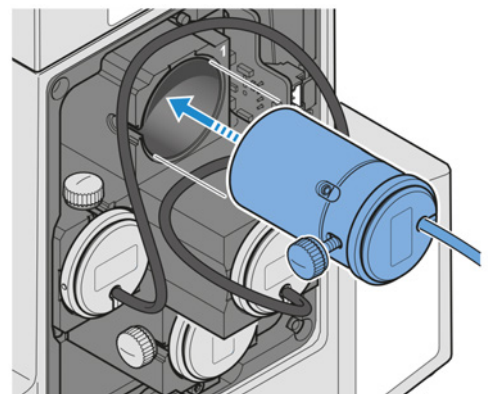
Info If LED module 1 is to be replaced, the knurled screw of LED module 3 must be removed first. Otherwise LED module 1 cannot be removed due to limited space.



5. Remove the defective LED module.
6. Loosen the knurled screw from the defective LED module and keep it for later use.

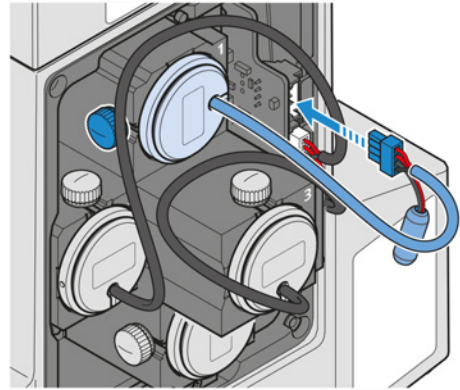


7. Insert the new LED module.

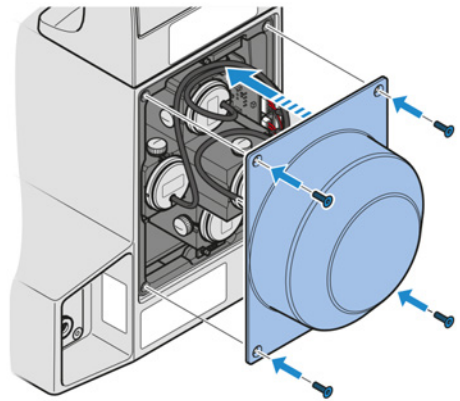


8. Tighten the knurled screw to fix the LED module.

9. Connect the LED module to the corresponding port.



10. Install the cover.



11. Tighten the four screws of the rear cover.

7 Troubleshooting

The following table provides hints for solving common problems. If you cannot solve the problem or if you are unsure about a certain technical difficulty, contact your local ZEISS service representative.

Symptom	Cause	Measure
No illumination light after switching on the microscope.	Nosepiece and/or reflector turret are not engaged to defined positions.	Move the nosepiece and/or reflector turret to the left or right to engage the nosepiece and/or reflector turret to defined positions. Then restart the microscope.
	LED module defective	<i>Exchange the LED module [▶ 36].</i>
Shading or brightness irregularities in the field of view of the microscope; the field of view is not fully visible.	Nosepiece with objective is not fully engaged in its locking position.	Engage the nosepiece with the objective in its locking position.
Asymmetric image sharpness, e.g. one side is sharp, one side is blurred.	Nosepiece is not engaged in its locking position.	Engage the nosepiece in its locking position (click-diaphragm).
	Sample is not fixed correctly on the mechanical stage.	Insert and fix the sample correctly in the sample holder.
Distinct focus differences when changing the objective.	Objective is not screwed in all the way.	Screw the objective in to the stop.
Dirt or dust in the field of view.	Dirt or dust on optical surfaces of objectives, condensers, filters or samples.	<i>Clean the soiled optical component [▶ 35].</i>
Low resolution and poor contrast.	Dirt or dust on optical surfaces of objectives or condenser.	

Tab. 2: Troubleshooting on the microscope

8 Decommissioning and Disposal

This chapter contains information on the decommissioning and disposal of the microscope and its expansions/components or accessories.

8.1 Decommissioning

If the microscope and its components are not used for an extended period of time such as several months, they should be shut down completely and secured against unauthorized access.

NOTICE

Property damage due to short circuit

When the microscope is still switched on, coming in contact with electronic parts can lead to a short circuit.

- ▶ Switch off the microscope prior to opening or cleaning.
- ▶ Disconnect live parts from the power supply.

- Procedure**
1. Switch off the microscope.
 2. Pull the mains plug.

8.2 Transport and Storage

The following regulations must be observed before and during transport:

- Use devices (e.g. handles, fork lifts or hand pallet trucks) to transport the microscope safely to the installation room. In clean-room environments, this check is mandatory. The microscope may only be transported in air-suspended vehicles. Devices for transporting the microscope must be rated to handle its full weight and dimensions.
- Moving parts must be secured during transport to prevent them from slipping or tipping over.
- Avoid rocking the transport boxes back and forth.
- Note the weight information on the package and on the shipping document.
- Where possible, the original packaging must be used for shipping or transport.

Allowable temperatures Allowable temperature during on-site storage and transport in packaging:

- Between -40 °C and +70 °C
- Relative humidity less than 93 % at +40 °C

Allowable temperature during shipping in packaging:

- Between -40 °C and +70 °C
- Relative humidity less than 93 % at +40 °C

Info

24 hours before installation of the microscope it is required that the boxes be at recommended room temperature to avoid ingress of humidity, which is very harmful to optical paths, and to ensure effective stability of the microscope during installation and testing.

8.3 Disposal

The microscope and its components 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.

8.4 Decontamination

A decontamination statement must be submitted before returning any used objects to the ZEISS location.

If reliable decontamination cannot be guaranteed, the hazard must be marked according to applicable regulations. In general, a well-visible warning sign must be affixed to the article itself and to the outside of the packaging, together with detailed information on the type of contamination.

9 Technical Data and Conformity

This chapter contains important technical data as well as information on the conformity.

9.1 Performance Data and Specifications

The microscope must only be operated in closed rooms. It is recommended to install the microscope in a dimmed room where artificial illumination, sunlight or other light sources cannot interfere with image acquisition. The microscope should not be installed near radiators or windows with direct sunlight. The microscope must be placed securely on the table surface to prevent slipping and falling.

Compliance with the installation requirements of the microscope and the availability of the requested supplies is the responsibility of the customer and has to be readily available at the time of installation.

The microscope must be plugged into a properly installed power socket with protective earth contact using the supplied mains cable. The protective earth connection must not be impaired by the use of extension cables.

Info

Your ZEISS Sales & Service Partner will provide you with the detailed installation requirements.

Weight and Sizes

Main Components	Length (mm)	Width (mm)	Height (mm)	Weight (kg)
Axiovert 5 digital	503	244	505	18.2

Air Conditioning and Quality

Temperature range for operation with indicated performance (24 h per day, regardless of whether the microscope is in operation or switched off)

5 to 40 °C

Relative humidity

< 80 % at 40 °C

Atmospheric pressure / altitude

800 to 1060 hPa / ≤ 2000 m above sea level

Pollution degree

2

Mains connection

Nominal AC voltage

L/N/PE 100 to 240 VAC ± 10 %

Nominal frequency

50/60 Hz

Max. current

1.4 A

Rating for microscope stand

24 VDC, 5 A

Protection class

IP20 (IEC 60529)

Overvoltage Category

II

Integrated Illumination System RGB-UV	Color	Wave- length (nm)	Exitable dyes (examples)	Expected lifetime (h)
	Red	625	Cy5, Alexa 631, TOTO-3	> 60000
	Green	565	Cy3, TRITC, DsRed	> 60000
	Blue	470	eGFP, Fluo4, FITC	> 60000
	UV	385	DAPI, Alexa 405, Hoechst 33258	> 40000
	Cyan (optional)	505	eYFP, Eosin, TOTO-1	> 60000
	Yellow (optional)	590	mCherry, Alexa 568, mPlum	> 60000

Tablet PC	Apple®	
	iPad Pro™	12.9" 4th Gen or higher
	Microsoft®	
	Surface Pro™ 7	12.3" CPU: i5 or higher RAM: 8GB or higher
	Surface Pro™ 8	13" CPU: i5 or higher RAM: 8GB or higher

9.2 Applicable Standards and Regulations

Observe all general and country-specific safety regulations as well as applicable environmental protection laws and regulations.

The microscope is in compliance with the requirements of the following regulations and directives:

2011/65/EU	Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)
2015/863/EU	Commission Delegated Directive (EU) 2015/863 of 31 March 2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances (RoHS Directive III)
2014/30/EU	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility

2014/35/EU	Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
EN 61010-1:2019	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements
EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

According to directive 2011/65/EU (RoHS) the microscope and its accessories have been classified as instrument category 9 (Monitoring and control instruments including industrial monitoring and control instruments). They also fall under 2012/19/EU (WEEE).

European and International Directives / Standards: For more information on ISO and CSA certificates or CE Declarations of Conformity, contact your ZEISS Sales & Service Partner.

ZEISS works according to a certified Environment Management System according to ISO 14001. The microscope and its components were developed, tested, and produced in accordance with the valid regulations and guidelines for environmental law of the European Union.

**Declaration of
China RoHS 2
关于电器电子产品
有害物质限制
说明**

Microscopes and accessories of the Carl Zeiss Suzhou Co.,Ltd., are in compliance with China RoHS Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) SJ/T 11364 with respect to lead, mercury, cadmium, hexavalent chromium, poly-brominated biphenyls (PBB) or polybrominated diphenylethers (PBDE) content.

兹证明，根据中国电器电子产品有害物质限制使用管理办法，我司产品符合中国对电器电子产品中含铅及其化合物、汞及其化合物、镉及其化合物、六价铬化合物、多溴联苯、多溴二苯醚六种有害物质的法规要求

The toxic substances or elements
有毒有害物质或元素

	Lead (Pb) 铅	Mercury (Hg) 汞	Cadmium (Cd) 镉	Hexava- lent chromiu m (Cr6+) 六价铬	Poly- bromi- nated diphenyl ether (PBB) 多溴联苯	Poly- bromi- nated diphenyl ether (PBDE) 多溴二苯 醚
Cable 电线	x	o	o	o	o	o
Electroni- cal Parts 电子电路	x	o	o	o	o	o
Optical Parts 光学部件	x	o	x	o	o	o
Mechani- cal Parts 机械部件	x	o	o	o	o	o
Lamps 灯	x	x	o	o	o	o

o = Indicates that this toxic or hazardous substance contained in the homogeneous materials for this part, is below the limit requirement in GB/T 26572

表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。

x = Indicates that this toxic or hazardous substance contained in the homogeneous materials for this part, is above the limit requirement in GB/T 26572.

表示该有害物质至少在该部件某一均质材料中的含量超出GB/ T26572规定的限量要求。

有关废弃物处理办法, 请与我司中国销售部联系:

卡尔蔡司 (上海) 管理有限公司 中国 (上海) 自由贸易试验区美约路 60 号

邮编 200131

电话: +86 (21) 20821188

传真: +86 (21) 50481193

9.3 Usability of LED Modules

Position	Slot 1	Slot 2	Slot 3	Slot 4
Wavelength range [nm]	450-480	350-415	594-660	508-565
385 nm LED	X	O	X	X
470 nm LED	O	X	X	X
505 nm LED	X	X	X	O
565 nm LED	X	X	X	O
590 nm LED	X	X	O	X
625 nm LED	X	X	O	X

O = usable

X = not usable

10 Accessories and Optional System Expansions

Only the following accessories may be used with the microscope as their safe use has been confirmed by ZEISS. Only original parts from ZEISS may be used. Check in advance whether your microscope can be retrofitted with a system expansion or accessories.

After installation or conversion it must be carefully checked whether the microscope and its system expansions/accessories are in a safe operational state and whether unused ports are closed. For details and safety measures please refer to the associated documents.

Info

Further information on the software and its operation is available in the software's online help.

Info

For additional information and detailed descriptions, refer to further applicable documents or ask your ZEISS Sales & Service Partner.

Name	Description/info
Various objectives	<p>The performance of the microscope objectives affects the image quality of your microscope like no other system component. Whether you work with histological samples, cell samples or entire organisms – the suitability of microscope objectives for your application depends on various factors.</p> <p>More detailed information on available and recommended objectives can be found at https://www.micro-shop.zeiss.com/de/de/shop/objectives or ask your ZEISS Sales & Service Partner.</p>
Various sample stages	<p>Sample stages can be adjusted manually in XY direction. The stage's range of travel depends on the type.</p>
Reflector modules without filter sets	<p>Several filter sets can be installed into the empty reflector modules. The maximum filter thickness is 5 mm. Reflections are avoided by inclined mounting of the emission filters.</p>
Filter sets	<p>Filters are available for various dyes and dye combinations.</p>
LED modules	<p>The following LED modules are available:</p> <ul style="list-style-type: none"> ▪ Red (625 nm) for excitation of Cy5, Alexa 631, TOTO-3 and similar dyes ▪ Yellow (590 nm) for excitation of mCherry, Alexa 568, mPlum and similar dyes (optional) ▪ Green (565 nm) for excitation of Cy3, TRITC, DsRed and similar dyes ▪ Cyan (505 nm) for excitation of eYFP, Eosin, TOTO-1 and similar dyes (optional) ▪ Blue (470 nm) for excitation of eGFP, Fluo4, FITC and similar dyes ▪ UV (385 nm) for excitation of DAPI, Alexa 405, Hoechst 33258 and similar dyes
Wi-Fi dongle	<p>The Wi-Fi dongle is available for connecting the microscope stand with the tablet PC.</p> <p>For more detailed information on availability in your region ask your ZEISS Sales & Service Partner.</p>

Name	Description/info
Aqua stop	The aqua stop protects the objectives and the nosepiece when working with liquid samples.

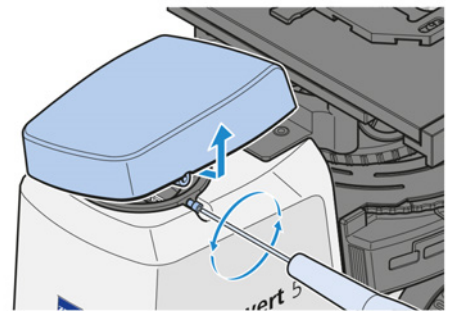
10.1 Assembling the Wi-Fi Dongle

Info

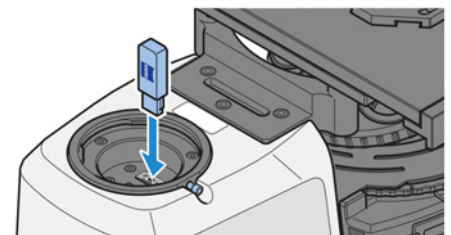
The Wi-Fi dongle is an independent item and if it is applicable in the region, it needs to be ordered separately.

Parts and Tools  Hex Key, 3.0 mm

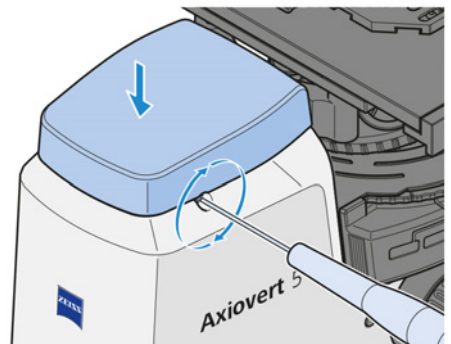
- Procedure**
1. Loosen the screw on the cover.
 2. Push the cover to the right and lift it up.



3. Plug the Wi-Fi dongle into the USB port.



4. Install the cover.
5. Tighten the screw.



10.2 Aqua Stop II

Purpose The aqua stop II protects the objectives and the nosepiece when working with liquid samples.

Position The aqua stop II is mounted on the nosepiece carrier.

10.2.1 Assembling the Aqua Stop II

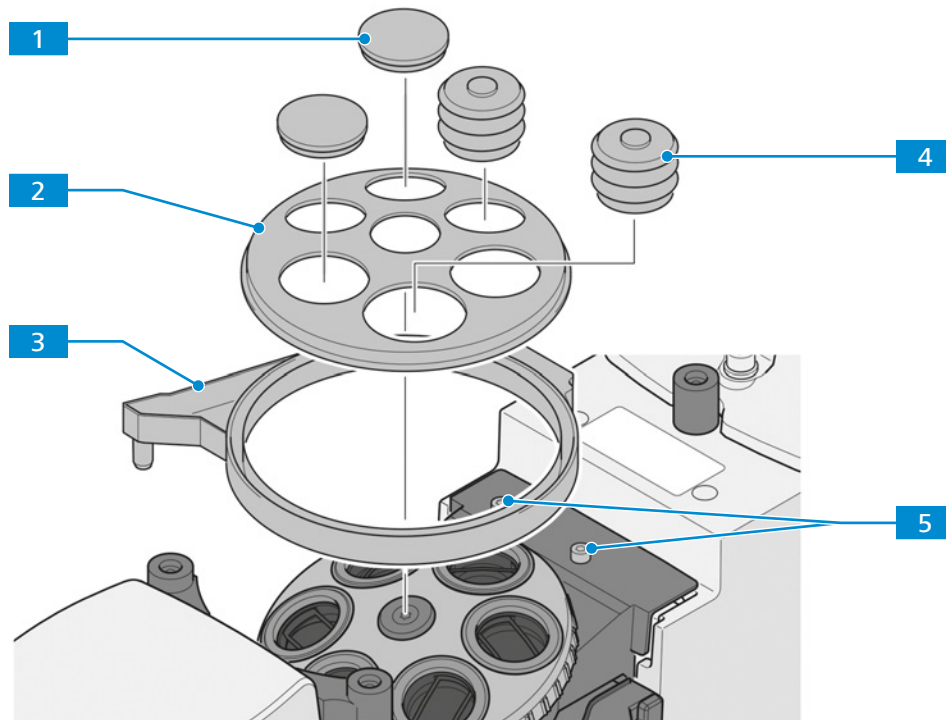


Fig. 8: Assembling the aqua stop II

- | | |
|----------------------------|---------------------|
| 1 Cover cap | 2 Cover disc |
| 3 Collecting trough | 4 Lens hood |
| 5 Mounting holes | |

Parts and Tools  Hex Key, 3.0 mm

- Prerequisite**
- ✓ The stage is removed from the stand.
 - ✓ All objectives and cover caps are removed from the nosepiece.

- Procedure**
1. Remove the two cover screws from the mounting holes **5**.
 2. Place the collecting trough **3** on the nosepiece mount.
 3. Screw the collecting trough's two screws into the mounting holes **5**.
 4. Place the cover disk **2** at the nosepiece, matching the corresponding holes to those for the objectives.
 5. Install the required objectives.
 6. **NOTICE Make sure that each objective is enclosed up to the cover disk and that no hood's upper edge forms a drip tray!**
Pull a **small** lens hood **4** over each objective of a front diameter of **16 to 22.5 mm**.
 7. Pull a **large** lens hood **4** over each objective of a front diameter of **27.5 to 34 mm**.
 8. Close the unused nosepiece openings with cover caps **1**.

9. Attach one end of the drainage tube to the collecting trough's drainage connector.
10. Put the drainage tube's other end through the collecting bottle's plug, such that the tube protrudes about 4 mm below the plug.
11. **NOTICE** **Adjust the drainage tube such that it will not be bent through focusing.**
Firmly insert the plug into the collecting bottle.
12. Attach the Velcro® fastener to the stand.
13. Fix the collecting bottle with the Velcro® fastener to the stand.
14. Install the stage.

Proceed in the reverse order for removal.

NOTICE

Performance impairment by liquids

Residues of accidents involving liquids are very likely to impair the performance of optical parts.

- ▶ After any accident involving liquids, remove the stage and soak up every drop of liquid from the optics and the nosepiece with a lint-free cloth.
- ▶ Pay special attention to cleaning the front lens of the objective!

Cleaning instructions can be found in the brochure "The Clean Microscope".

11 Revision History

Revision	Date of Issue	Introduced Modifications
3	01/2023	<ul style="list-style-type: none">▪ Editorial rework
2	01/2023	<ul style="list-style-type: none">▪ Editorial rework▪ Implementation of UKCA marking▪ Implementation of revision history
1	06/2022	<ul style="list-style-type: none">▪ First edition

Tab. 3: Revision History

Glossary

BF (Brightfield)

Illumination and imaging system where direct light passes through the objective aperture and provides a bright background against which the image is viewed.

EMC (Electromagnetic compatibility)

Ability of equipment to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to other equipment in that environment.

FL (Fluorescence)

Phenomenon of a selective absorption of radiation with relatively short wavelength (i.e., relatively high energy) by matter with the result of the emission of radiation with longer wavelengths (i.e., lower energy), which persists only very briefly after the excitation has ceased.

LED (Light emitting diode)

Solid state device embodying a p-n junction, emitting optical radiation when excited by an electric current.

Ph (Phase contrast)

Method in which, for example, differences in density in very thin samples are made visible by converting the phase shift through the object into a change in amplitude.

PPE (Personal protective equipment)

Equipment used to protect persons from harm in the working environment.

TL (Transmitted light)

Light used for illuminating an object, where the light is transmitted through the object.

ZEISS Sales & Service Partner

The Sales & Service Partner is generally in the field for customer support in a regional area and / or a clearly defined customer group.

ZEISS service representative

Specially trained service expert, either ZEISS staff or authorized service partner of ZEISS.

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