

Instruction Manual  
**ZEISS Primostar 3**  
Upright Microscope for Education and Routine



## ZEISS Primostar 3

Original Manual



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# 1 About this Instruction Manual

This Instruction Manual (further called "document") is considered to be part of the Primostar 3, herein after referred to as "microscope".

Primostar 3 microscopes include:

- Primostar 3
- Primostar 3 iLED

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

Example	Explanation
	The names of controls and important information are shown in bold letters, for instance:
Click <b>Start</b> .	Software controls and GUI elements.
Press the <b>Standby</b> button.	Hardware controls and elements.
Press <b>Enter</b> on the keyboard.	Key on the keyboard.
Press <b>Ctrl + Alt + Del</b> .	Press several keys on the keyboard simultaneously.
Select <b>Tools &gt; Goto Control Panel &gt; Airlock</b> .	Follow a path in the software.
Enter <i>example.pdf</i> in this field.	Text to be entered by the user.
Programming and Macros	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> [▶ 6].	Link to further information for this topic.
<a href="https://www.zeiss.com/corporate/int/home.html">https://www.zeiss.com/corporate/int/home.html</a>	Link to a website on the internet.

Tab. 2: Link types

## 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 Further Applicable Documents

Also take note of the following documents:

#### **Brochures and Certificates**

For brochures, ISO certificates, CSA certificates, and EU declarations of conformity 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.

## 1.4 Contact

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

#### **Headquarters**

Phone: +49 1803 33 63 34

Fax: +49 3641 64 3439

Email: [info.microscopy.de@zeiss.com](mailto:info.microscopy.de@zeiss.com)

**Microscopy Courses, Training, and Education**

For information on microscopy courses, training, and education contact us on our homepage (<https://www.zeiss.com/microscopy/int/service-support/training-and-education.html#contact>).

**ZEISS Portal**

The ZEISS Portal (<https://portal.zeiss.com/>) offers various services that simplify the daily work with your ZEISS systems (machines and software). It is constantly improved and extended to meet your needs and requirements better.

**ZEISS Sales & Service Partner**

You can find a ZEISS Sales & Service Partner in your area under <https://www.zeiss.de/mikroskopie/website/forms/sales-and-service-contacts.html>.

**Service Germany**

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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.

Any serious incident that has occurred in relation to the microscope and its components shall be reported to these institutions:

- the competent authority of the Member State in which the user is established
- ZEISS
  - for users within the EU:  
Carl Zeiss Microscopy GmbH, Jena, Germany
  - for users outside the EU:  
Carl Zeiss Suzhou Co., Ltd., Suzhou, China

### 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 microscopes Primostar 3, Primostar 3 iLED are instruments for general microscopic imaging for the in vitro-examination of various biological samples including samples collected from humans or animals. This imaging provides information to further assess physiological and pathological conditions.

The microscopes are intended to be used by trained professionals only.

#### 2.1.2 Lifetime

A microscope is an opto-electronic device. Its availability for use is significantly determined by the performed maintenance. ZEISS guarantees the ability for maintenance and repair within eight years after initial operation. This is ensured by a corresponding service and spare parts concept, thus enabling the intended purpose within this duration.

#### 2.1.3 EMC Information

The microscope is intended to be used in a basic electromagnetic environment. The electromagnetic environment should be evaluated prior to operation of the microscope. Do not use the microscope in proximity to sources of strong electromagnetic radiation, as these can interfere with proper operation.

Use of this microscope in a dry environment, especially if synthetic materials are present (synthetic clothing, carpets, etc.), may cause electrostatic discharges that may cause erroneous results.

Electromagnetic interference (EMI) according to CISPR 11 Group 1:

- Class B (without Binocular tube 25°/22 w/int cam 8 MPx)
- Class A (with Binocular tube 25°/22 w/int cam 8 MPx)

If in doubt, contact a ZEISS service representative.

## 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.

**Training** Authorized ZEISS personnel will provide basic training in operating the microscope. As well as information on equipment safety and maintenance work that can be conducted by the operator. The training will be documented by ZEISS and its completion is to be confirmed by the operator. Special application training is offered for a fee. Current training dates, additional information and the registration form can be found at <https://www.zeiss.com/microscopy/int/service-support/training-and-education.html>.

### 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.

### 2.2.3 Order and Use of Spare Parts

Using spare parts that are not provided by ZEISS can be hazardous or can lead to property damage.

- Unless authorized by ZEISS, all spare parts should be installed by a ZEISS service representative.
- Contact your ZEISS service representative for information on spare parts order.
- Only genuine parts supplied by ZEISS are to be used in servicing the microscope.

## 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

- 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, if applicable, for transport of the microscope. Otherwise hold the microscope with one hand and the base plate with the other hand.

### 2.3.2 Electrical Hazards

- Voltage Hazards** Risk of electric shock in case of contact with live parts.
- Always use the power adapter supplied by ZEISS. When an unsuitable power adapter is used, ZEISS can no longer guarantee the electrical safety and functionality of the microscope.
- Shut down the microscope.
  - Disconnect the power supply before cleaning.
  - Set up and operate the microscope so that the connectors are easily accessible.
  - Position the microscope stand in a way so that you can easily unplug the power cable at any time.
- Safe disconnection from the mains is ensured exclusively by removing the mains plug. The switch on the rear side of the microscope only switches into standby mode.

### 2.3.3 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).

### 2.3.4 Ergonomic Hazards

- Prevention of Musculoskeletal Disorders** Musculoskeletal disorders (MSDs) affect the muscles, nerves, blood vessels, ligaments and tendons. Workers in many different industries and occupations can be exposed to risk factors at work, such as lifting heavy items, bending, reaching overhead, pushing and pulling heavy loads, working in awkward body postures and performing the same or similar tasks repetitively. Employers are responsible for providing a safe and healthful workplace for their workers.

### 2.3.5 Hazards Generated by Materials and Substances

<b>Infection Hazards</b>	<p>Direct contact with the eyepieces can be a potential way of passing on bacterial and viral infections.</p> <ul style="list-style-type: none"> <li>▪ 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.</li> <li>▪ 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.</li> </ul>
<b>Consumable Hazards</b>	<p>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 &amp; Service Partner to learn what consumables you can order and how to handle them.</p>
<b>Disinfectant Hazards</b>	<p>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.</p>
<b>Eye, Skin, Respiratory Tract Irritation</b>	<p>Exposure to chemicals and their aerosols can cause eye, skin and respiratory tract irritation. Use appropriate personal protective equipment (PPE).</p>

### 2.3.6 Hazards Generated by Radiation

<b>Optical Radiation Hazards</b>	<p>Gas discharge lights, LED lights and other sources of white light 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.</p> <ul style="list-style-type: none"> <li>▪ Avoid exposure of eyes and skin to radiation.</li> <li>▪ Do not introduce reflective objects into the beam path.</li> <li>▪ Never remove covers or cover panels during operation.</li> <li>▪ Do not disable any interlock system elements.</li> <li>▪ Use suitable protective equipment / protective clothing if required.</li> </ul>
<b>Electromagnetic Radiation Hazards</b>	<p>In a domestic environment the microscope may cause radio interference, which may be mitigated by relocating or re-orienting the equipment. The use of non-specified accessories, cables, or other auxiliary parts from the field of information technology may lead to increased electromagnetic emissions and reduced immunity to interference. Any integration into the system may result in a degradation of the EMC performance.</p>

## 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 on the Primostar 3

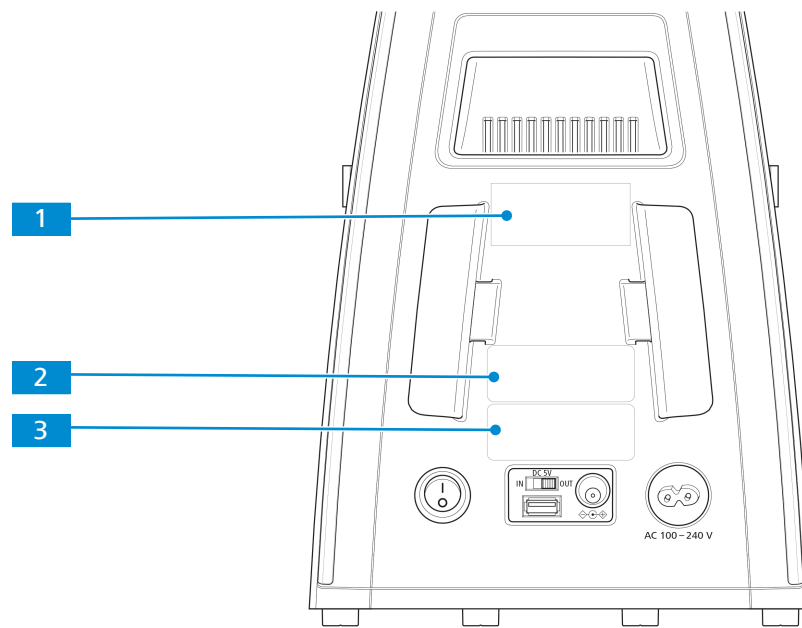


Fig. 1: Labels on the microscope rear side

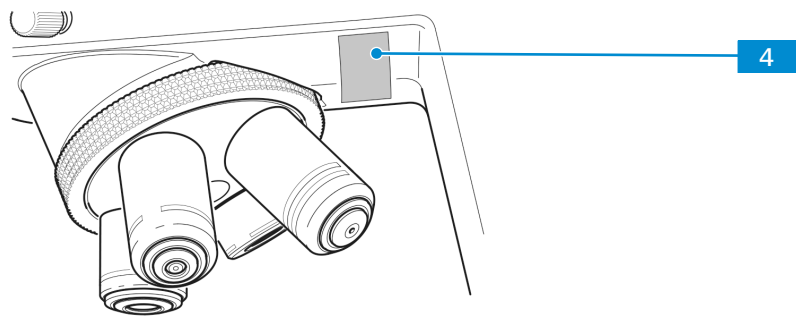


Fig. 2: Label behind the nosepiece

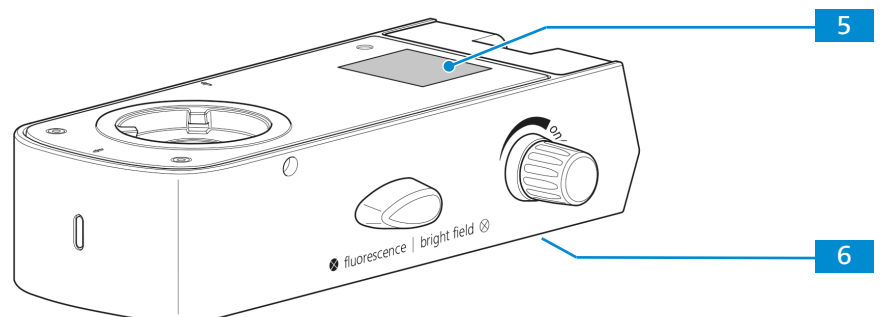
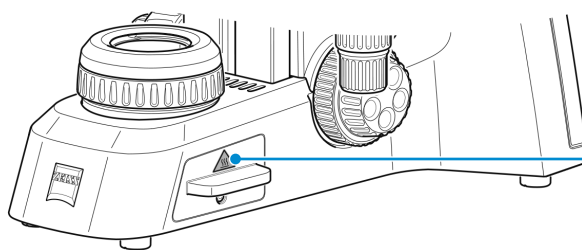
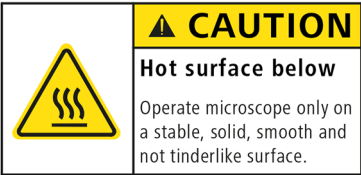
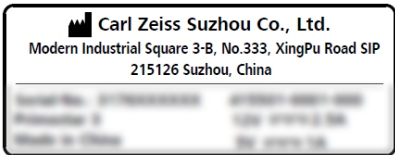
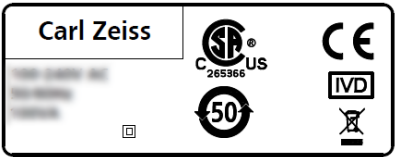

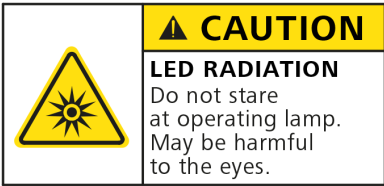
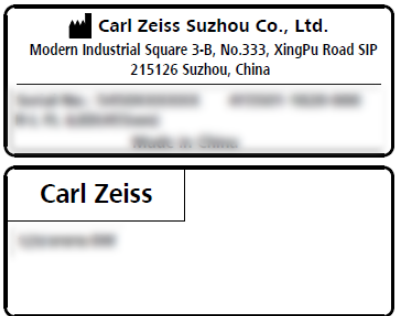




Fig. 3: Labels on the fluorescence unit



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Fig. 4: Label on the halogen module of the Full-Köhler stand

Pos.	Label or light	Explanation
1		<p>CAUTION</p> <p>Hot surface below</p> <p>Operate microscope only on a stable, solid, smooth and not tinderlike surface.</p>
2		Microscope type label
3		Microscope type label
4		<p>Primostar 3</p> <p>EU representative label</p> <p>Carl Zeiss Microscopy GmbH</p> <p>Carl-Zeiss-Promenade 10</p> <p>07745 Jena, Germany</p>
5		<p>CAUTION</p> <p>LED RADIATION</p> <p>Do not stare at operating lamp. May be harmful to the eyes.</p>
6		Fluorescence unit type label

Pos.	Label or light	Explanation
7		Hot surface
*		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.

### 2.5.1 Safety Device of the Reflected-Light FL iLED

To prevent personal injury and/or property damage, the reflected-light FL iLED is equipped with an interlock function, which causes the built-in LED of the reflected-light FL iLED to be switched off as soon as the reflected-light FL iLED is turned with regard to the stand or detached.

Defective and damaged safety devices can lead to injuries and damage. In the event of damage or defect, the affected parts and the entire microscope must be taken out of operation immediately and secured against unintentional use.

To check the microscope safety, contact your ZEISS Sales & Service Partner and keep the service protocols for your microscope.

## 3 Product and Functional Description

The Primostar 3 is a transmitted-light microscope of compact design with a small footprint. The microscope provides high resolution, infinity-corrected objectives for all important transmitted-light techniques, such as brightfield, darkfield, simple polarization, and phase contrast microscopy.

The microscope is optionally available with a camera port for photo and video documentation. For special camera applications the optional binocular tube 25°/22 is equipped with an integrated smart 8 MP color camera.

### Typical Applications

- examination of blood and tissue samples taken from the human body, from plants, or animals
- medical examinations in laboratories, hospitals, and doctors' offices
- academic and practical education in medicine and biology
- industrial applications, e.g. in pharmacology, food technology, and wastewater examination

### Info

Additional information about the hardware configuration and optional enhancements can be obtained from your ZEISS Sales & Service Partner.

### 3.1 Main Components of the Primostar 3

The Primostar 3 has the following main components:

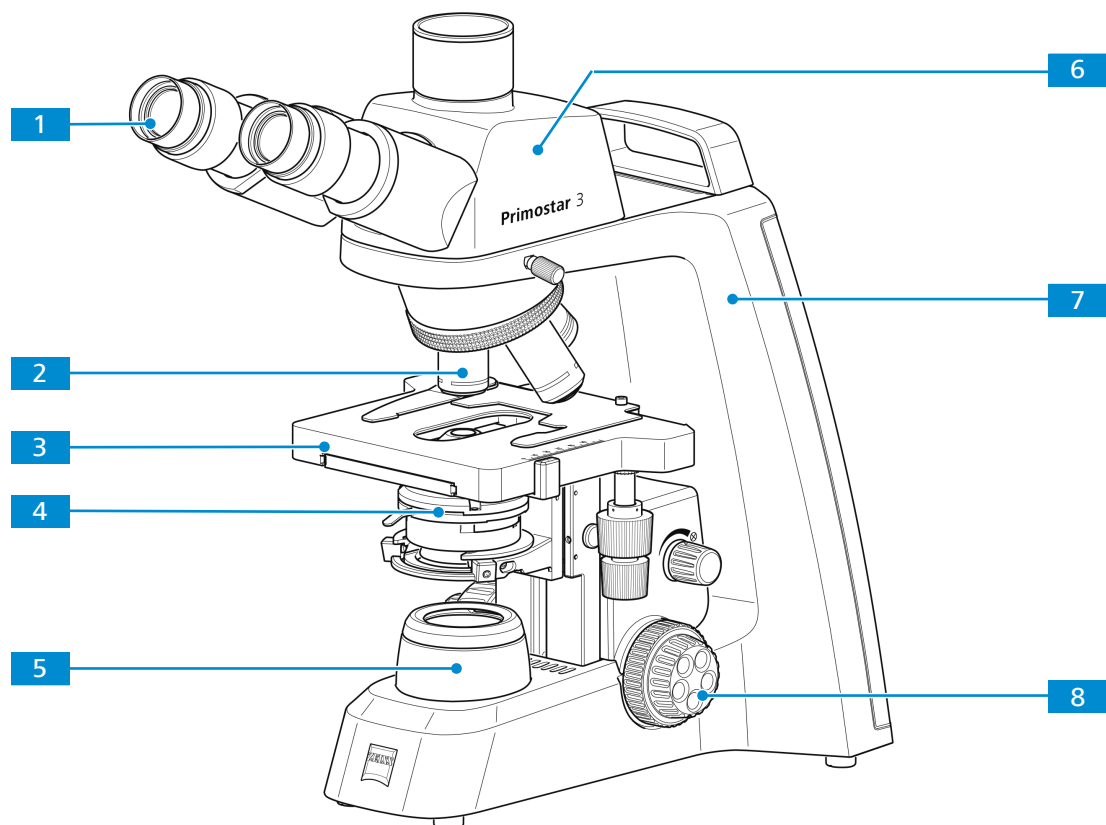


Fig. 5: Main components of the Fixed-Köhler microscope

- |  |   |
|--|---|
| <b>1</b> Eyepiece [ <a href="#">▶ 38</a> ] | <b>2</b> Objective                          |
| <b>3</b> Stage                             | <b>4</b> Condenser [ <a href="#">▶ 37</a> ] |
| <b>5</b> Illumination                      | <b>6</b> Tube                               |
| <b>7</b> Stand                             | <b>8</b> Focusing drive                     |

### 3.1.1 Components of Primostar 3 Fixed-Köhler

The Fixed-Köhler microscope has the following components:

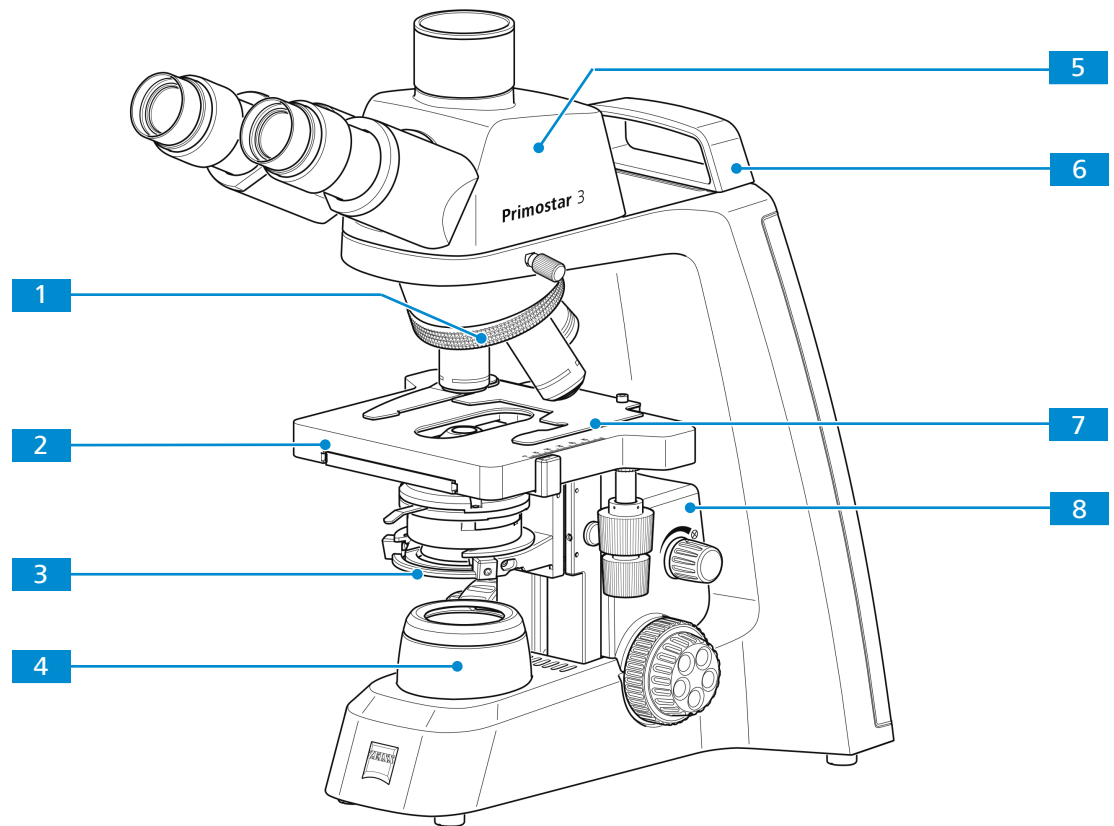


Fig. 6: Components of the Fixed-Köhler microscope

- |          |   |          |   |
|----------|---|----------|---|
| <b>1</b> | Nosepiece with four positions           | <b>2</b> | Rackless stage 75x40, drive right or drive left |
| <b>3</b> | Condenser carrier                       | <b>4</b> | Luminous-field diaphragm                        |
| <b>5</b> | Trinocular tube 25°/20 (50:50)          | <b>6</b> | Small hand lift                                 |
| <b>7</b> | Specimen holder left for rackless stage | <b>8</b> | Stage carrier                                   |

### 3.1.2 Components of Primostar 3 iLED (Fixed-Köhler)

The Fixed-Köhler microscope with reflected light FL iLED has the following main components:

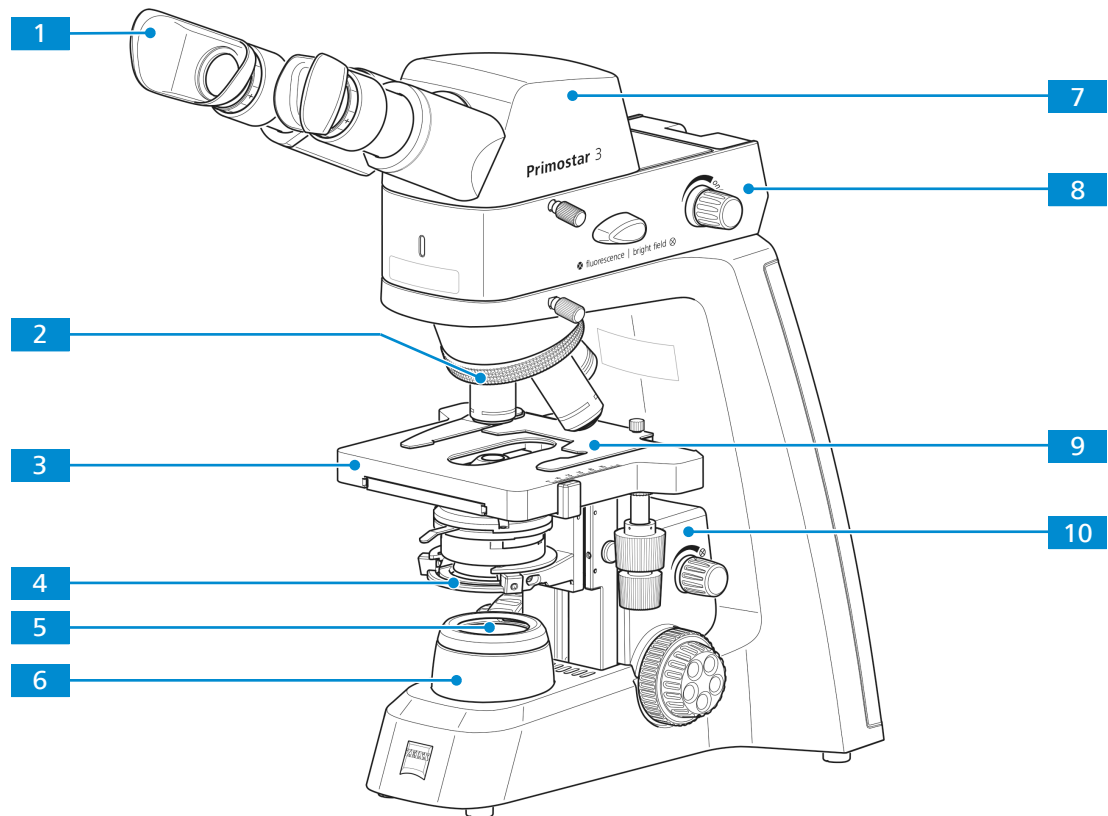


Fig. 7: Components of the Fixed-Köhler microscope with iLED

- |   |  |
|---|--|
| <b>1</b> Special eyecups with light protection mounted  | <b>2</b> Nosepiece with four positions |
| <b>3</b> Rackless stage 75x40, drive right or drive left  | <b>4</b> Condenser carrier             |
| <b>5</b> Yellow filter inserted (with filter position for adapting the color temperature in transmitted light and with position for blocking the transmitted-light path in case of reflected-light fluorescence applications) | <b>6</b> Luminous-field diaphragm      |
| <b>7</b> Binocular tube 25°/20  | <b>8</b> Reflected-light FL iLED       |
| <b>9</b> Specimen holder left for rackless stage  | <b>10</b> Stage carrier                |

### 3.1.3 Components of Primostar 3 (Fixed-Köhler) with Binocular Tube

The Fixed-Köhler microscope with Binocular tube 25°/22 w/int cam 8 MPx has the following components:

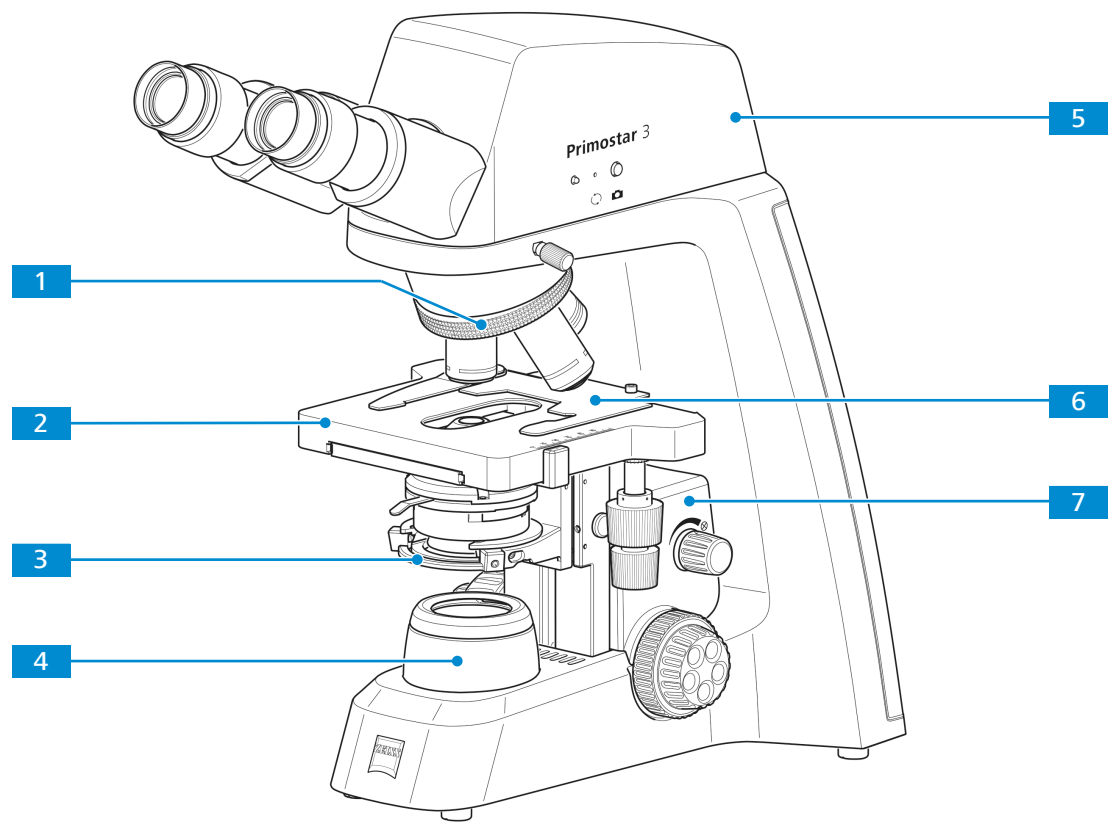


Fig. 8: Main components of Fixed-Köhler microscope with Binocular tube 25°/22 w/int cam 8 MPx

- |   |  |
|---|--|
| <b>1</b> Nosepiece with four positions                | <b>2</b> Rackless stage 75x40, drive right or drive left |
| <b>3</b> Condenser carrier                            | <b>4</b> Luminous-field diaphragm                        |
| <b>5</b> Binocular Tube 25°/22 w/int Cam 8 MPx [▶ 28] | <b>6</b> Specimen holder left for rackless stage         |
| <b>7</b> Stage carrier                                |  |

### 3.1.4 Components of Primostar 3 Full-Köhler

The Full-Köhler microscope has the following components:

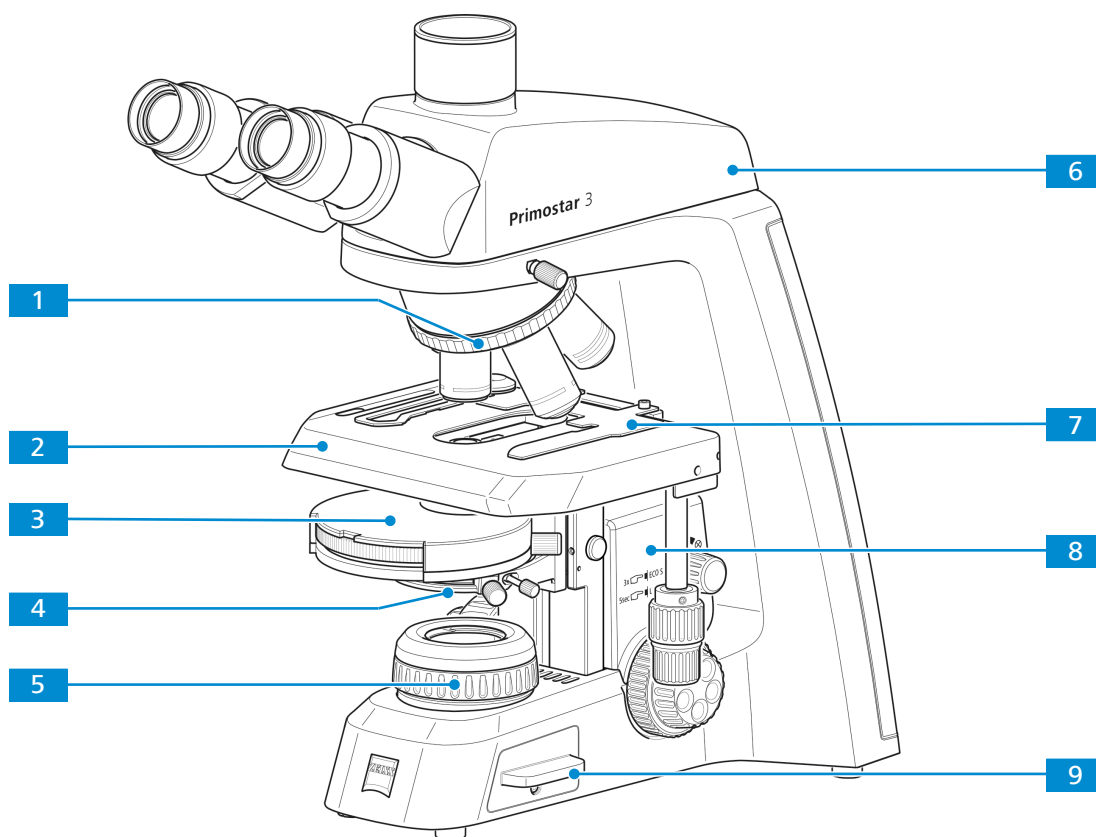


Fig. 9: Components of the Full-Köhler microscope

- |  |   |
|--|---|
| <b>1</b> Nosepiece with five positions   | <b>2</b> Rackless stage 75x50, drive right or drive left                  |
| <b>3</b> Turret condenser 0.9/1.25 field 22 or Abbe Condenser 0.9/1.25 Field 20 [▶ 37] | <b>4</b> Condenser carrier with centering screws for condenser adjustment |
| <b>5</b> Luminous-field diaphragm  | <b>6</b> Trinocular tube 25°/22 (50:50)                                   |
| <b>7</b> Specimen holder for 2 sliders   | <b>8</b> Stage carrier  |
| <b>9</b> Transmitted-light illuminator, LED or HAL                                     |   |



## 3.2 Controls and Connections

### 3.2.1 Fixed-Köhler Stand

**Purpose** The controls on the stand control the main functions of the microscope.

**Position** The following controls are located on the right side of the stand.

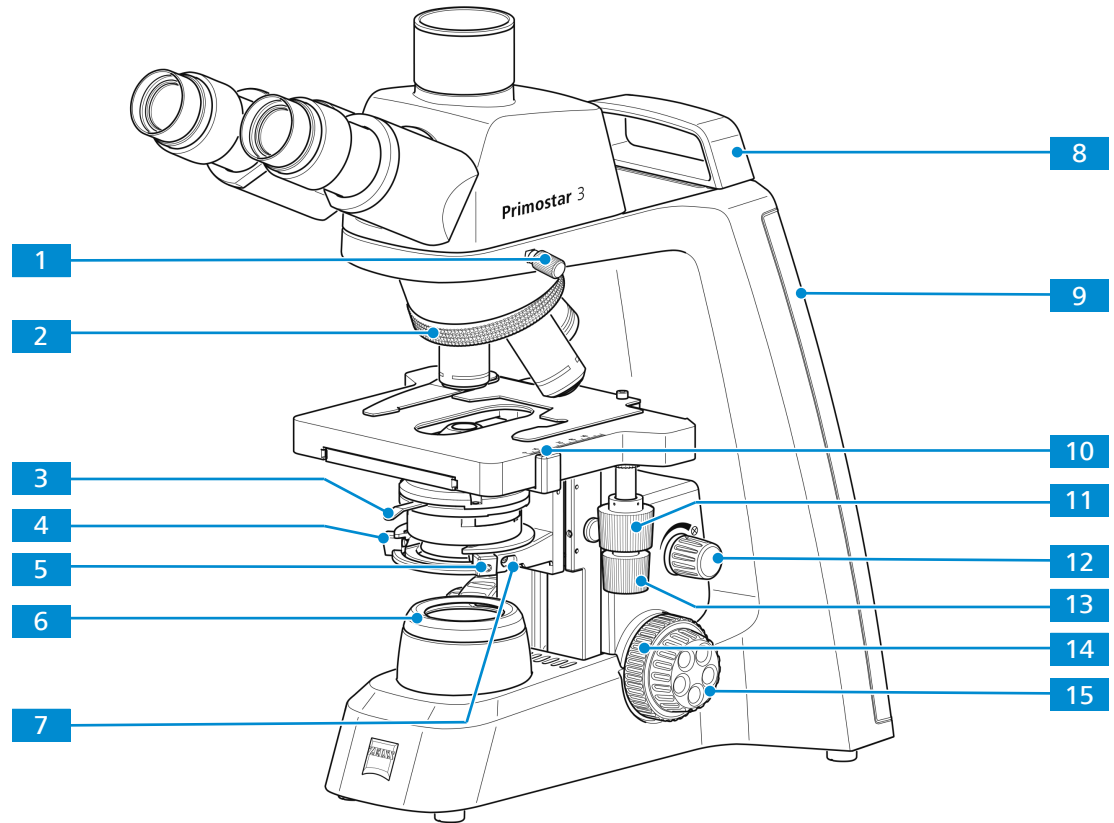
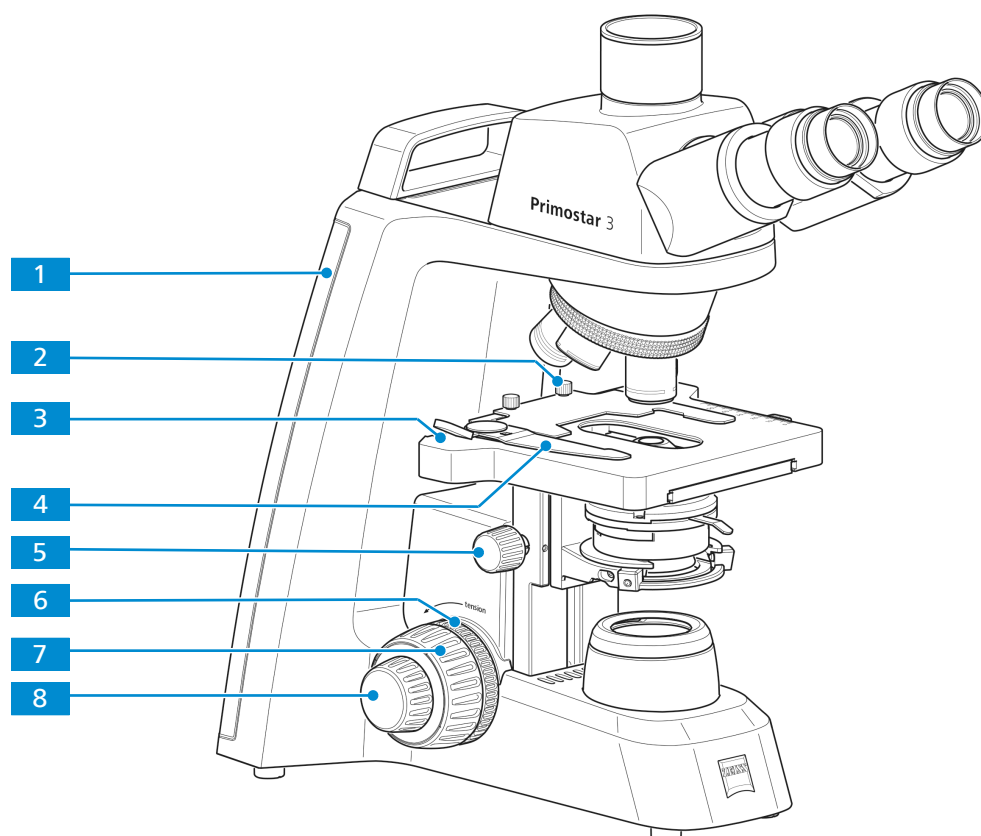


Fig. 10: Stand controls on the right side

- |   |   |
|---|---|
| <b>1</b> Clamping screw for tube  | <b>2</b> Knurled ring for turning the nosepiece                                       |
| <b>3</b> Lever for adjusting the aperture diaphragm of the condenser, see also <i>Abbe Condenser 0.9/1.25 Field 20</i> [► 37]   | <b>4</b> Centering screw (Allen screw) for condenser on condenser carrier (left side) |
| <b>5</b> Centering screw (Allen screw) for condenser on condenser carrier (right side)  | <b>6</b> Cover cap of the luminous-field diaphragm                                    |
| <b>7</b> Clamping screw for condenser   | <b>8</b> Small hand lift (only Fixed-Köhler stand)                                    |
| <b>9</b> Illumination-intensity indicators for transmitted light (right side)<br>The selected intensity is indicated in five layers by the Cyan light-emitting diodes belt. | <b>10</b> Vernier and scale, displaying the Y position of the stage                   |
| <b>11</b> Control knob for Y travel of rackless stage   | <b>12</b> Rotary knob to adjust the illumination intensity for transmitted light      |
| <b>13</b> Control knob for X travel of rackless stage   | <b>14</b> Coarse focusing drive (right side)  |
| <b>15</b> Fine focusing drive (right side)  |   |

**Position** The following controls are located on the left side of the stand.



*Fig. 11: Stand controls on the left side*

- |  |  |
|--|--|
| <p><b>1</b> Illumination-intensity indicators for transmitted light (left side)<br/>The selected intensity is indicated in five layers by the Cyan light-emitting diodes belt.</p> | <p><b>2</b> Clamping screw for the specimen holder</p>                                 |
| <p><b>3</b> Vernier and scale, displaying the X position of the stage</p>  | <p><b>4</b> Lever of the specimen holder for fixing the specimen</p>                   |
| <p><b>5</b> Knurled ring for condenser height adjustment</p>   | <p><b>6</b> Knurled ring for adjusting the smoothness of the coarse focusing drive</p> |
| <p><b>7</b> Coarse focusing drive (left side)</p>  | <p><b>8</b> Fine focusing drive (left side)</p>  |

**Position** The following controls and connections are located on the rear side of the stand.

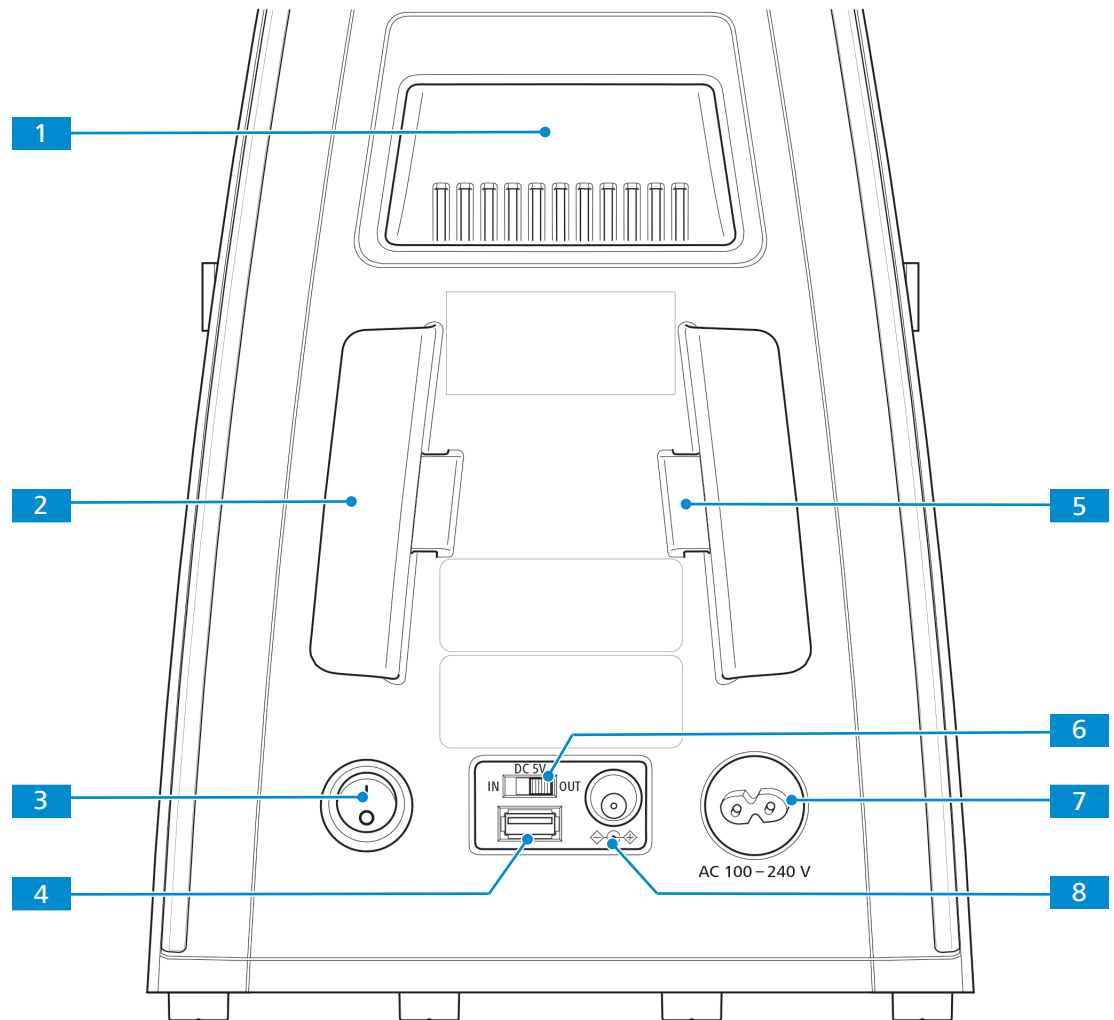


Fig. 12: Stand controls and connections on the rear side

- |  |  |
|--|--|
| <b>1</b> Carrying handle                               | <b>2</b> Holder for power cable                              |
| <b>3</b> <b>Main power ON/OFF</b> button               | <b>4</b> 5V USB port for mobile power bank                   |
| <b>5</b> Storage place for phase plate adjustment tool | <b>6</b> <b>DC 5V</b> switch                                 |
| <b>7</b> Mains socket                                  | <b>8</b> Connection port for external DC power supply (12 V) |

### Info

When the **DC 5V** switch **6** is set to the **OUT** position, the maximum output of the USB port **4** is 1 A.

### 3.2.2 Full-Köhler Stand

**Purpose** The controls on the stand control the main functions of the microscope.

**Position** The following controls are located on the right side of the stand.

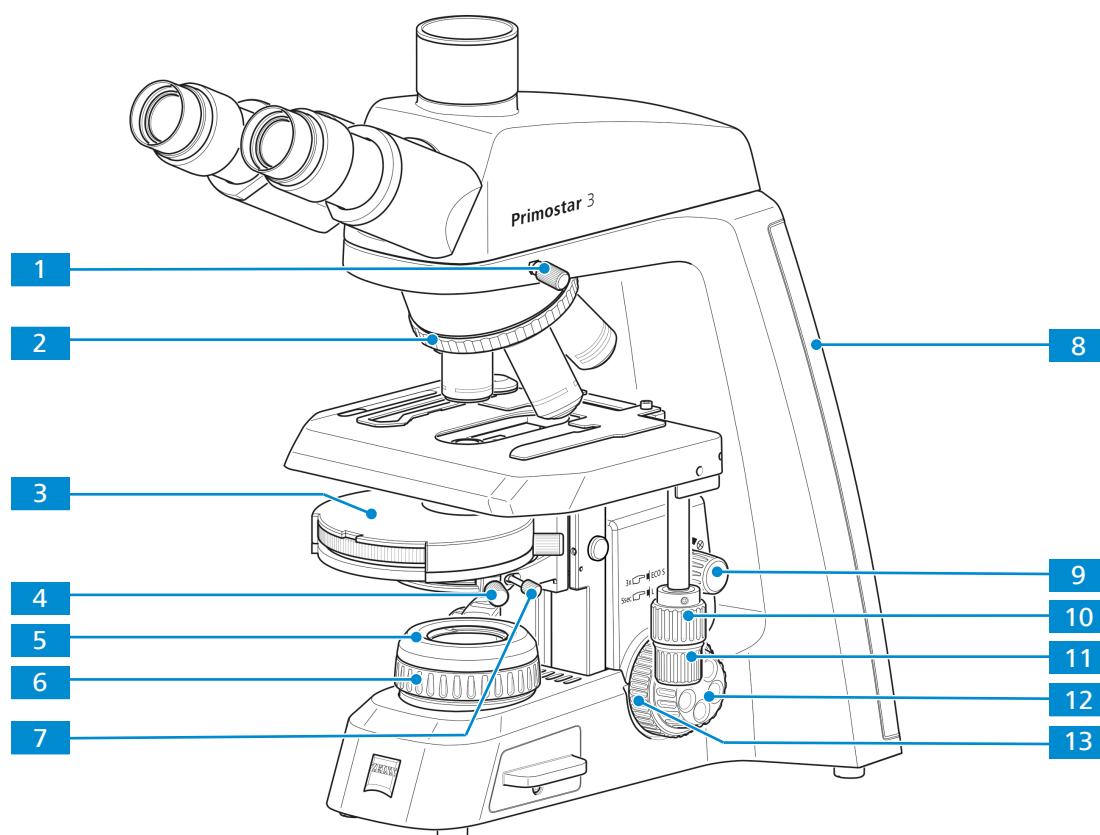
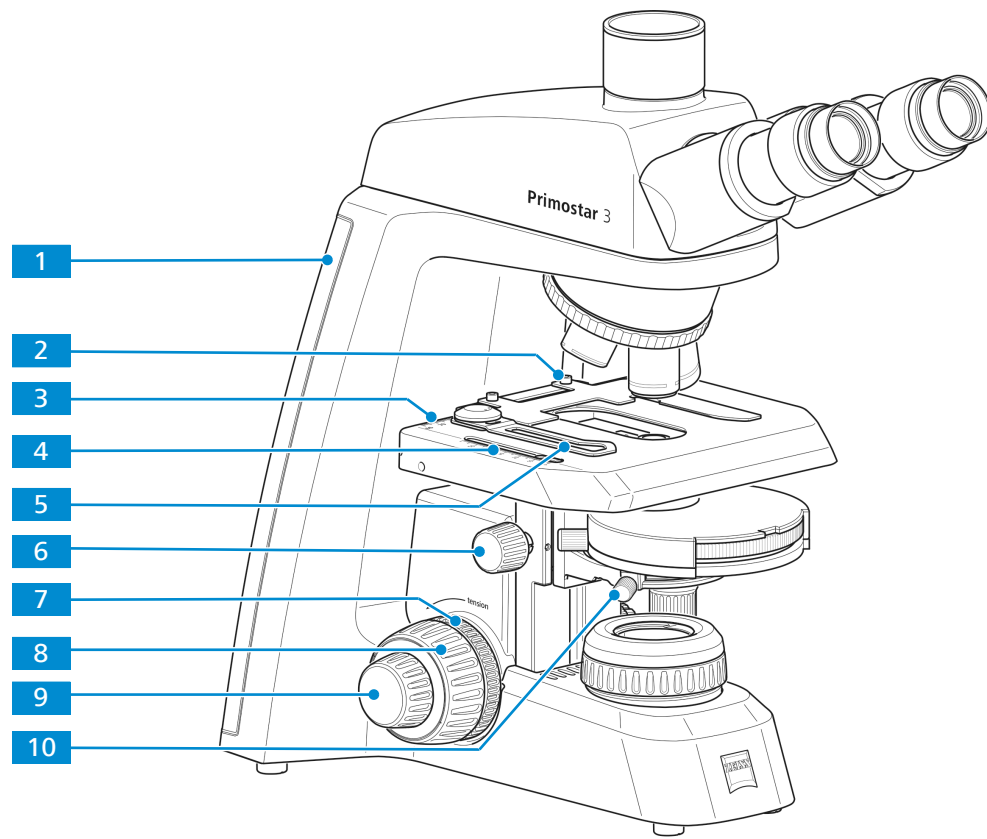


Fig. 13: Stand controls on the right side

- |   |   |
|---|---|
| <b>1</b> Clamping screw for tube  | <b>2</b> Knurled ring for turning the nosepiece   |
| <b>3</b> Turret condenser, controls see <i>Abbe Condenser 0.9/1.25 Field 20</i> [▶ 37]  | <b>4</b> Centering screw (knurled screw) for condenser on condenser carrier (right side)  |
| <b>5</b> Cover cap of the luminous-field diaphragm  | <b>6</b> Knurled ring for adjusting the luminous-field diaphragm  |
| <b>7</b> Clamping screw for condenser   | <b>8</b> Illumination-intensity indicators for transmitted light (right side)<br>The selected intensity is indicated in five layers by the Cyan light-emitting diodes belt. |
| <b>9</b> Rotary knob for varying the brightness of the microscopic image, for switching on / off the Light manager and the ECO mode | <b>10</b> Control knob for Y travel of rackless stage   |
| <b>11</b> Control knob for X travel of rackless stage   | <b>12</b> Fine focusing drive (right side)  |
| <b>13</b> Coarse focusing drive (right side)  |   |

**Position** The following controls are located on the left side of the stand.



*Fig. 14: Stand controls on the left side*

- |  |   |
|--|---|
| <p><b>1</b> Illumination-intensity indicators for transmitted light (left side)<br/>The selected intensity is indicated in five layers by the Cyan light-emitting diodes belt.</p> | <p><b>2</b> Clamping screw for the specimen holder</p>  |
| <p><b>3</b> Vernier and scale, displaying the X position of the stage<br/><br/>Knurled ring for condenser height adjustment</p>  | <p><b>4</b> Vernier and scale, displaying the Y position of the stage</p>                       |
| <p><b>5</b> Lever of the specimen holder for fixing the specimen</p>   | <p><b>6</b> Knurled ring for condenser height adjustment</p>                                    |
| <p><b>7</b> Knurled ring for adjusting the smoothness of the coarse focusing drive</p>   | <p><b>8</b> Coarse focusing drive (left side)</p>   |
| <p><b>9</b> Fine focusing drive (left side)</p>  | <p><b>10</b> Centering screw (knurled screw) for condenser on condenser carrier (left side)</p> |

**Position** The following controls and connectors are located on the rear side of the stand.

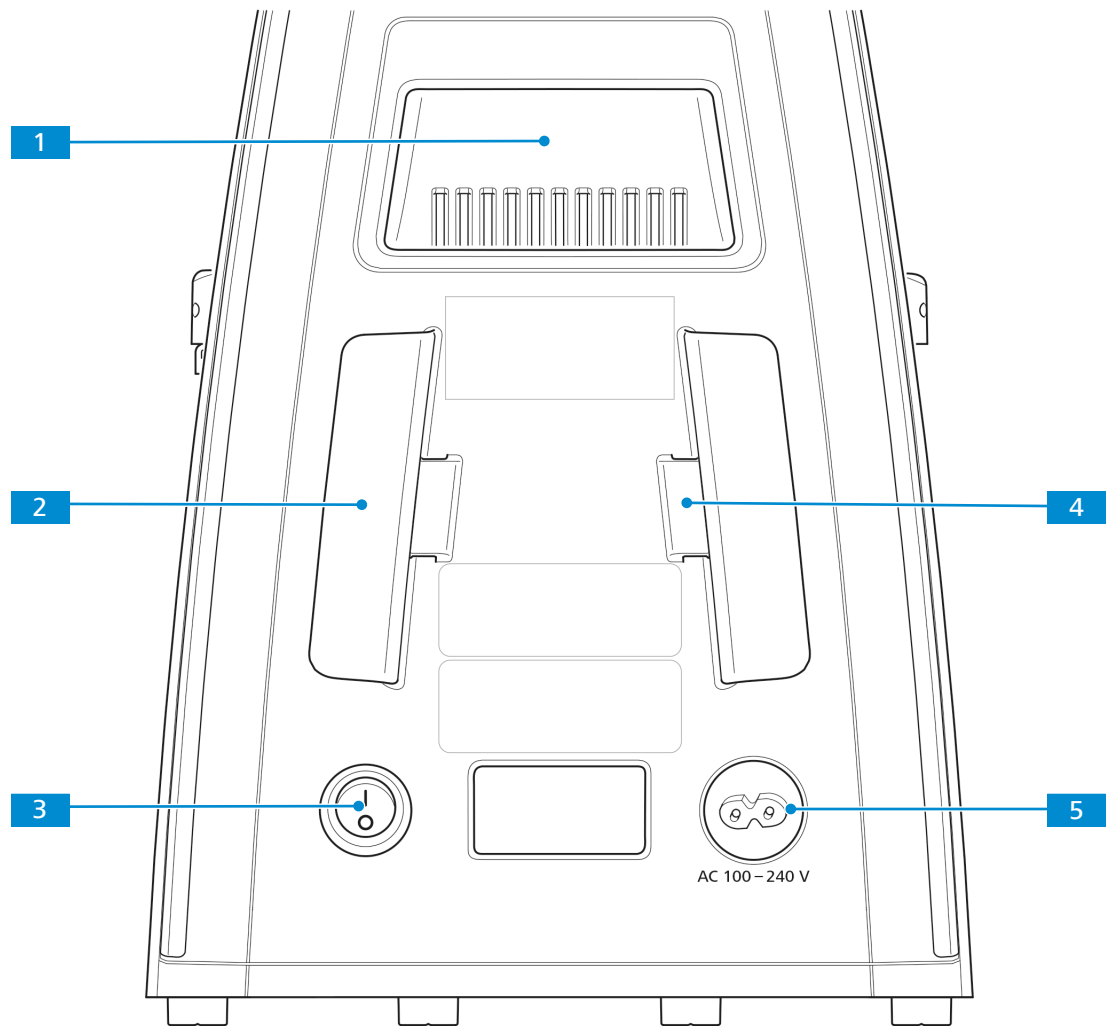


Fig. 15: Stand controls and connections on the rear side

- |  |  |
|--|--|
| <b>1</b> Carrying handle                 | <b>2</b> Holder for power cable                        |
| <b>3</b> <b>Main power ON/OFF</b> button | <b>4</b> Storage place for phase plate adjustment tool |
| <b>5</b> Mains socket                    |  |

**Function** For Full-Köhler stands, Light Manager, encoding function and sleeping mode are factory set up:

- The Light Manager enables the microscope to remember the best illumination setting from the previous use. When the microscope is set at the best illumination with objective A, light intensity will be remembered. You can switch to objective B and adjust the illumination. When you change back to objective A, light intensity will return to the last setting. The light intensity of all five objectives can be remembered.
- The Light Manager feature can be disabled by pushing the intensity knob for five seconds. You will see that the Cyan LED Belt reduces its intensity from Max to Min, indicating that the Light Manager is disabled. You can re-activate the Light Manager by the same process.
- If you do not touch the microscope for 30 minutes it will go into ECO mode. The lowest layer of the Cyan LED belt will "breathe" (blink slowly). Any movement of the nosepiece or the intensity knob will re-activate the microscope.
- The ECO mode can be disabled by triple clicking the intensity knob (for example in case of long time video shooting). You will see the Cyan LED belt illuminating once as a sign. Triple clicking the intensity knob again will reactivate ECO mode.

### 3.2.3 Reflected-Light FL iLED

**Purpose** To carry out examinations according to the reflected-light fluorescence method, the reflected-light FL iLED is required.

**Position** The reflected-light FL iLED is mounted on the Fixed-Köhler stand (without small handle lift).

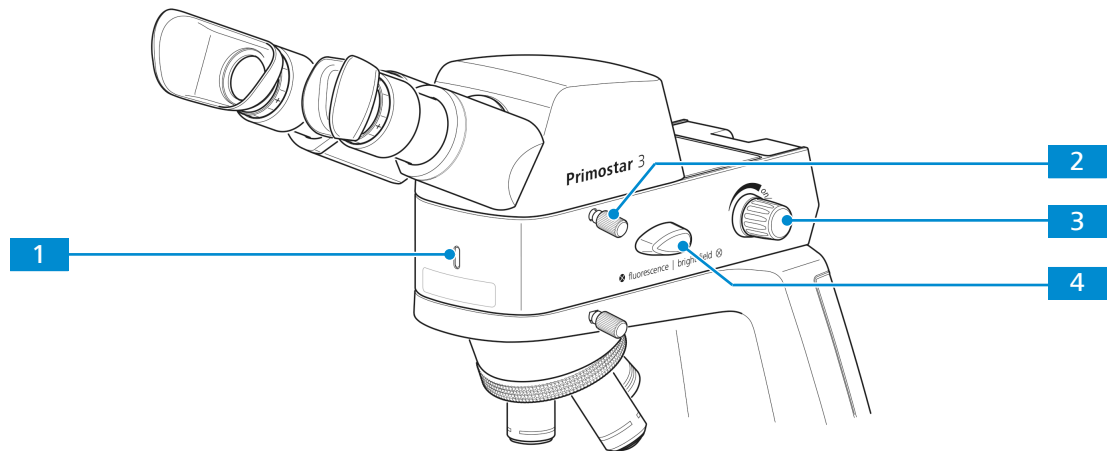


Fig. 16: Controls of the reflected-light FL iLED

- |  |  |
|--|--|
| <p><b>1</b> Pilot lamp for reflected-light FL iLED: lights up blue when switched on; brightness corresponds to intensity</p> | <p><b>2</b> Clamping screw for tube</p>  |
| <p><b>3</b> Rotary knob for switching ON/OFF and adjusting the intensity for reflected light</p>                             | <p><b>4</b> <b>fluorescence/brightfield</b> changeover switch<br/>Always turn the <b>fluorescence/bright-field</b> changeover switch first upward and then to the desired position. Using force to turn it downward will damage the reflected-light FL iLED.</p> |

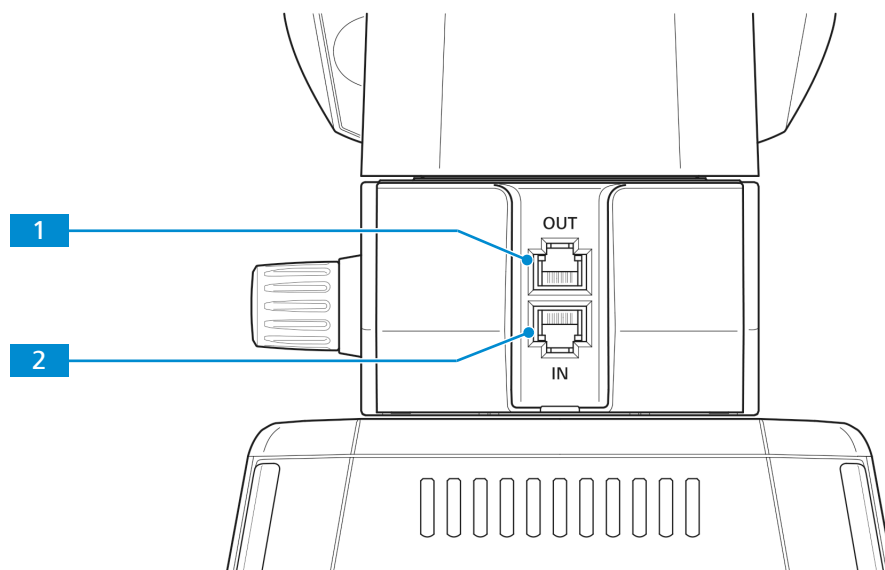


Fig. 17: Connections and special components on the rear side of the reflected-light FL iLED

- |  |   |
|--|---|
| <p><b>1</b> RJ12 port<br/>For power supply of the binocular tube 25°/22 w/int cam 8 MPX, if mounted additionally</p> | <p><b>2</b> RJ12 port<br/>For power supply of the reflected-light FL iLED</p> |
|--|---|

### 3.2.4 Binocular Tube 25°/22 w/int Cam 8 MPx

**Purpose** The Binocular tube 25°/22 w/int cam 8 MPx is used to visualize and transfer the microscopic image to an external medium, such as a separate monitor, PC or tablet PC, via data line or Wi-Fi connection.

**Position** The Binocular tube 25°/22 w/int cam 8 MPx can only be mounted on the stand without small handle lift.

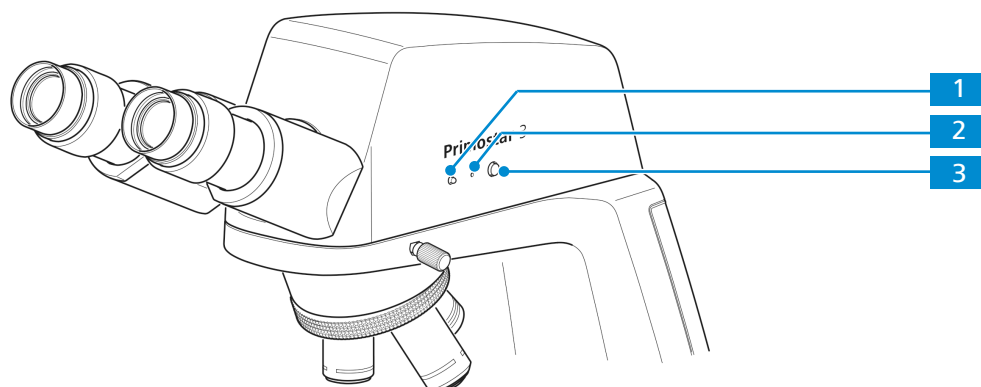


Fig. 18: Controls of the Binocular tube 25°/22 w/int cam 8 MPx

- |  |  |
|--|--|
| <p><b>1</b> <b>LED indicator:</b><br/>Shows the current camera working status.</p>   | <p><b>2</b> <b>Reset button:</b><br/>Restarts the camera by continuously pressing the button for 5 seconds using a clip.</p> |
| <p><b>3</b> <b>Snap button:</b><br/>Press briefly to trigger an exposure, press and hold to start a video recording, press briefly to stop a video recording</p> |  |

The states of the Binocular tube 25°/22 w/int cam 8 MPx are displayed by LED indicator.

Color	State	Status
pink	continuously	Start sequence
blue	flashing	Snapping/recording in process, and saving data to USB flash drive
blue	continuously	Power supplied and camera ready
red	flashing	Firmware updating/factory resetting
pink	flashing	No USB flash drive or the drive is full



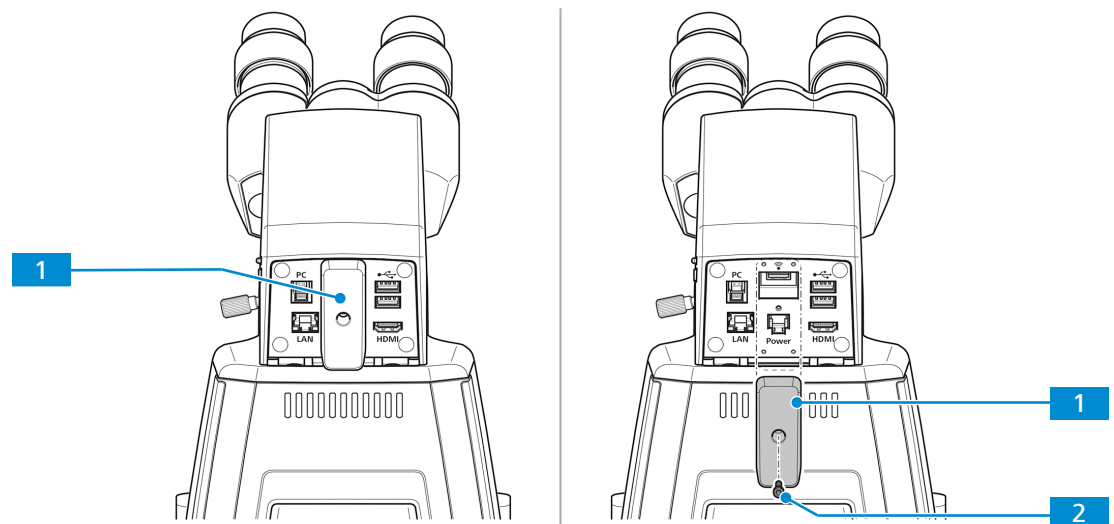


Fig. 19: Cover plate on the rear side of the Binocular tube 25°/22 w/int cam 8 MPx

- |  |  |
|--|--|
| <p><b>1</b> Cover plate<br/>For covering the USB TYPE A port and the RJ12 port</p> | <p><b>2</b> Cover plate lock screw<br/>For locking the cover plate</p> |
|--|--|

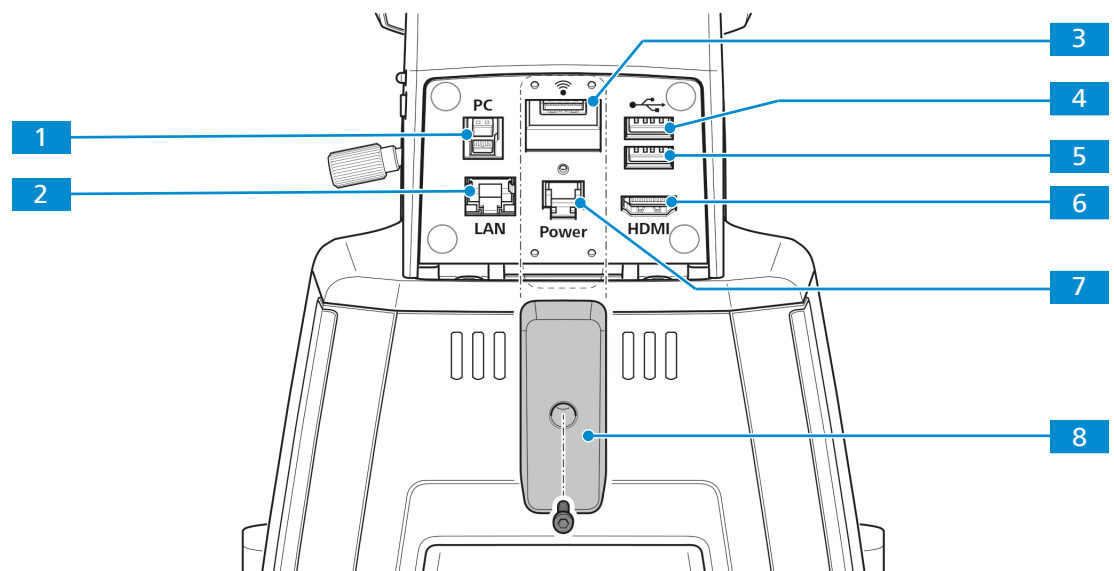


Fig. 20: Connections and special components of the Binocular tube 25°/22 w/int cam 8 MPx on the rear side

- |  |  |
|--|--|
| <p><b>1</b> USB TYPE B<br/>For image data transfer to a PC</p>   | <p><b>2</b> Fast Ethernet port (RJ45)<br/>For communication and image data transfer</p>                                  |
| <p><b>3</b> USB TYPE A<br/>Especially for Wi-Fi adapter</p>  | <p><b>4</b> USB TYPE A<br/>Optional: For storing image data to memory stick or for mouse or keyboard for OSD control</p> |
| <p><b>5</b> USB TYPE A<br/>Optional: For storing image data to memory stick or mouse or keyboard for OSD control</p> | <p><b>6</b> HDMI port<br/>For image data transfer to a monitor</p>   |
| <p><b>7</b> RJ12 port<br/>For power supply from stand</p>  | <p><b>8</b> Cover plate<br/>For covering the USB TYPE A port and the RJ12 port</p>                                       |

**Function** The visualized images of the Binocular tube 25°/22 w/int cam 8 MPx may only be used for training and research.

### Info

Direct generation of diagnostic results from these images is not recommended.

#### 3.2.4.1 On Screen Display (OSD) Menu of the Binocular Tube 25°/22 w/int Cam 8 MPx

When the Binocular tube 25°/22 w/int cam 8 MPx is powered and connected to a display device via HDMI, the OSD menu will be shown automatically on the connected display device.

##### 3.2.4.1.1 Home Menu

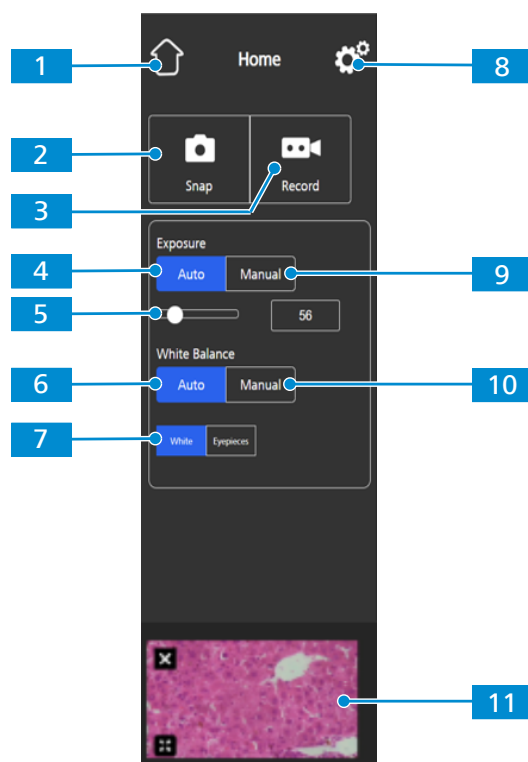


Fig. 21: **Home** menu, control elements

**1 Home button**

Opens the **Home** menu.

**2 Snap button**

Snaps a single image.

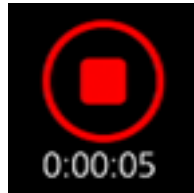
**3 Record button**

Starts a video recording. A time counter is displayed.

When pushing the button the following controls expand:

Enables you to manually re-adjust the exposure time, e.g. when the **Auto Exposure** mode does not deliver appropriate results.

When pushing the button the following controls expand:



The recording can be stopped by clicking the red square symbol above the time display.

**5 Target Intensity controls**

In **Auto Exposure** mode, the light intensity can be fine-tuned using the slider or the input field.

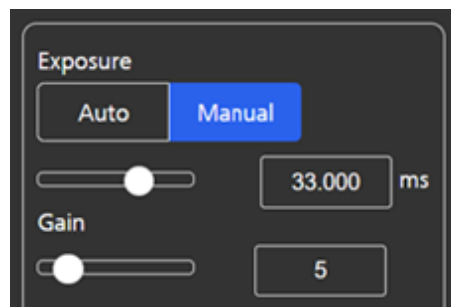
**7 White button**

If active, in the **Auto White Balance** mode the color temperature is calculated based on the assumption that the light source is white.

**9 Manual Exposure button**

Enables you to manually re-adjust the exposure time, e.g. when the Auto Exposure mode does not deliver appropriate results.

When pushing the button, the following controls expand:



The exposure time can be fine-tuned using the upper slider or input field.

The gain value can be set using the lower slider or input field.

**4 Auto Exposure button**

Ensures consistent brightness of the image by continuously calculating the correct exposure time based on the current light intensity.

**6 Auto White Balance button**

Ensures a consistent color temperature of the image by continuously calculating the white balance.

Note: Proper functioning of the **Auto White Balance** mode requires enough empty space in the field of view.

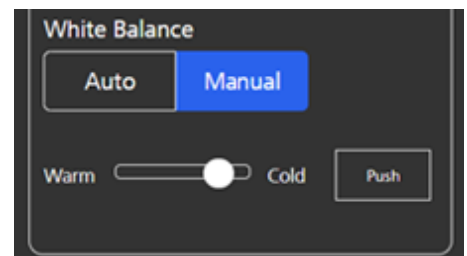
**8 Settings button**

Opens the **Settings** menu.

**10 Manual White Balance button**

Enables you to manually re-adjust the color temperature, e.g. when the Auto White Balance mode does not deliver appropriate results.

When pushing the button, the following controls expand:



The color temperature can be set warmer (more red) or colder (more blue) using the slider.

The white balance can be calculated once by clicking the **Push** button.

**11 Thumbnail area**

Shows a thumbnail of the last image taken, the first frame of the last video captured, or the merged image of the last multi-channel acquisition with overlaid pseudo-colors.

The thumbnail can be closed by clicking the **Close** symbol.

The thumbnail can be maximized to the full display by clicking the **Expand** symbol.

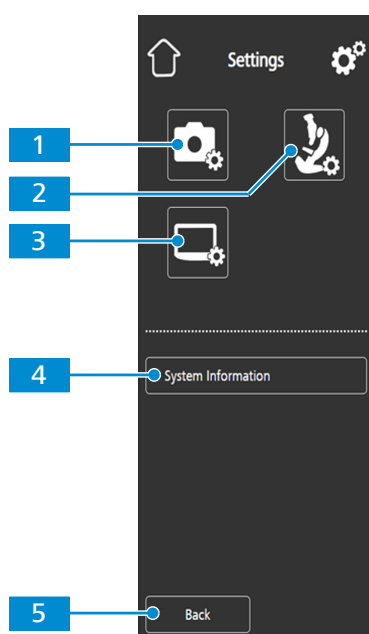
**3.2.4.1.2 Settings Menu**

Fig. 22: **Settings** menu, control elements

**1 Image Settings icon**

Opens the **Image Settings** menu.

**2 Microscope System Settings icon**

Opens the **Microscope System Settings** menu.

**3 Operating System Settings icon**

Opens the **Operating System Settings** menu.

**4 System Information button**

Shows the status of the entire camera/microscope system.

**5 Back button**

Opens the previous menu.

### 3.2.4.1.2.1 Image Settings Menu

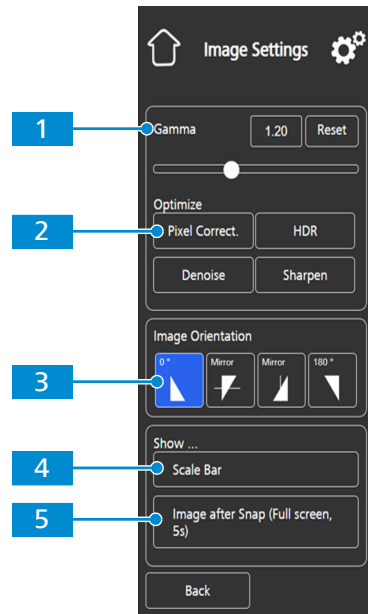


Fig. 23: *Image Settings* menu, control elements

#### 1 Gamma controls

Enable you to adjust the gamma value.

The gamma value can be fine-tuned using the slider or the input field.

The gamma value can be reset to default by clicking the Reset button.

Note: Default gamma value is 0.45.

#### 3 Image Orientation controls

Sets the image orientation.

0°: original image orientation

Mirror vertical: image mirrored in vertical direction

Mirror horizontal: image mirrored in horizontal direction

180°: image rotated by 180°

#### 5 Show ... Image after Snap button

If activated, the image is shown on the full display for five seconds after being captured. The full display image can be closed or minimized to a thumbnail if required.

#### 2 Optimize Denoise button

Reduces noise.

#### 4 Show ... Scale Bar button

Shows a scale bar on the live display.

Note: The scale bar will also appear in the captured image.

### 3.2.4.1.2.2 Microscope System Menu

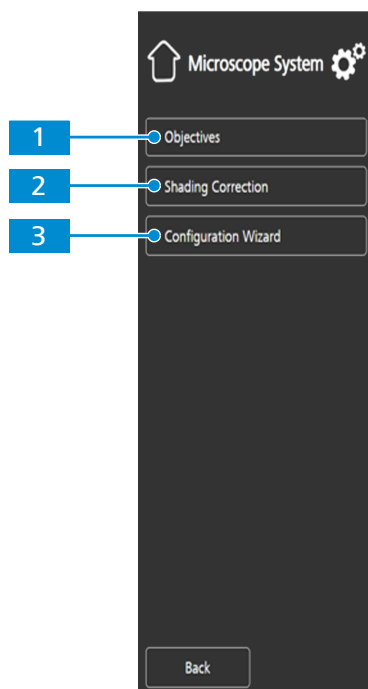
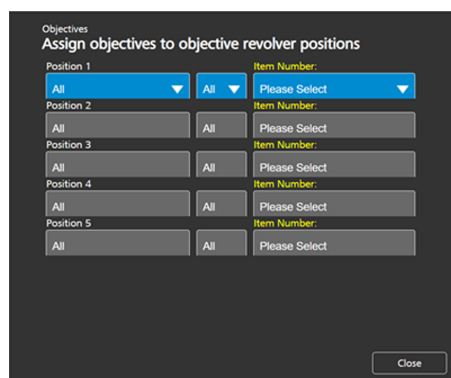


Fig. 24: **Microscope system** menu, control elements

#### 1 Objectives button (only for Full-Köhler stands)

Opens a drop-down list to define the item installed at the objective turret's current position.

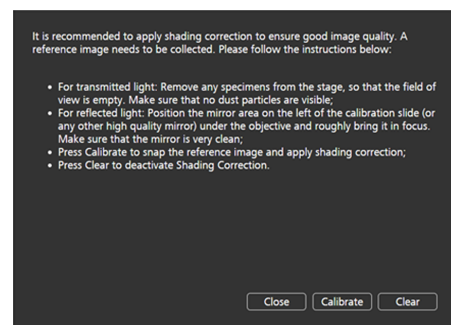


#### 3 Configuration Wizard button

Opens a wizard to support you in setting up all microscope configurations listed above.

#### 2 Shading Correction button

Opens a menu to define the shading correction for each combination of reflector, objective and light source.



### 3.2.4.1.2.3 Operating System Menu

The **Operating System** menu provides options such as setting the language, defining the file-name format, and updating the system firmware.

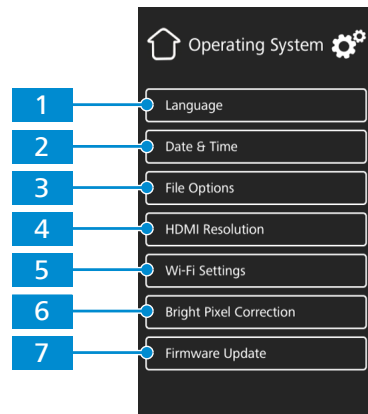


Fig. 25: **Operating System** menu, control elements

- |  |   |
|--|---|
| <p><b>1 Language button</b><br/>Opens a menu to set English, Chinese or German as operating system language.</p>   | <p><b>2 Date &amp; Time button</b><br/>Opens a menu to set date and time.</p>   |
| <p><b>3 File Options button</b><br/>Opens a menu to set the filename format and the file type for captured images, see <i>File Options Menu</i> [▶ 36].</p>  | <p><b>4 HDMI Resolution button</b><br/>Opens a menu to set the desired HDMI resolution for live view.<br/><br/>Notes:<br/>Switching from 1080p to 4K must be confirmed by pressing the <b>Confirm</b> button.<br/>The camera restarts automatically for the new resolution to take effect.<br/>If the connected monitor does not support 4K it automatically switches back to 1080p after 15 seconds.</p> |
| <p><b>5 Wi-Fi Settings button (for USB Wi-Fi adapter)</b><br/>Opens a workflow to set up a wireless connection, see <i>Wi-Fi Settings Menu</i> [▶ 36].</p>   | <p><b>6 Bright Pixel Correction button</b><br/>Opens the pixel correction dialog.</p>   |
| <p><b>7 Firmware Update button</b><br/>Starts a firmware update when the update file is available via the USB interface, see <i>Updating the Firmware of the Binocular Tube 25°/22 w/int Cam 8 MPx</i> [▶ 81].</p> |   |

### 3.2.4.1.2.3.1 File Options Menu

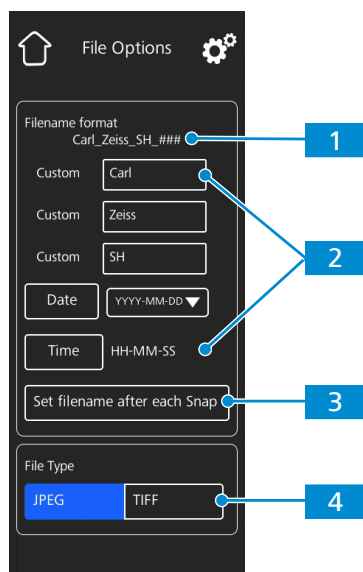


Fig. 26: **File Options** menu, control elements

**1** Filename format example

Shows the template of the filenames based on the currently selected components.

**2** Filename format components

Allows you to adjust the filename template.

Static text components (e.g. for sample names etc.) can be added by typing text into the Custom fields. Empty fields will be removed from the template.

The date and time format can be set.

A counter number is appended to each filename by default.

**3** Set Filename after each Snap button

Activates a prompt after each image capturing to manually set the filename.

**4** File type selection

Allows you to set the file type (**JPEG** or **TIFF**) for captured images.

### 3.2.4.1.2.3.2 Wi-Fi Settings Menu

When a compatible USB Wi-Fi adapter is inserted in the Binocular tube 25°/22 w/int cam 8 MPx, the **Wi-Fi Settings** menu will be displayed.

It offers the option to connect the camera to a Wi-Fi device (e.g. iPad or PC).



### 3.2.5 Abbe Condenser 0.9/1.25 Field 20

**Purpose** The condenser focuses the light from the light source to illuminate the object as evenly as possible, and to guide it as accurately as possible into the imaging beam path.

**Position** The condenser is mounted on the condenser carrier behind the specimen stage.

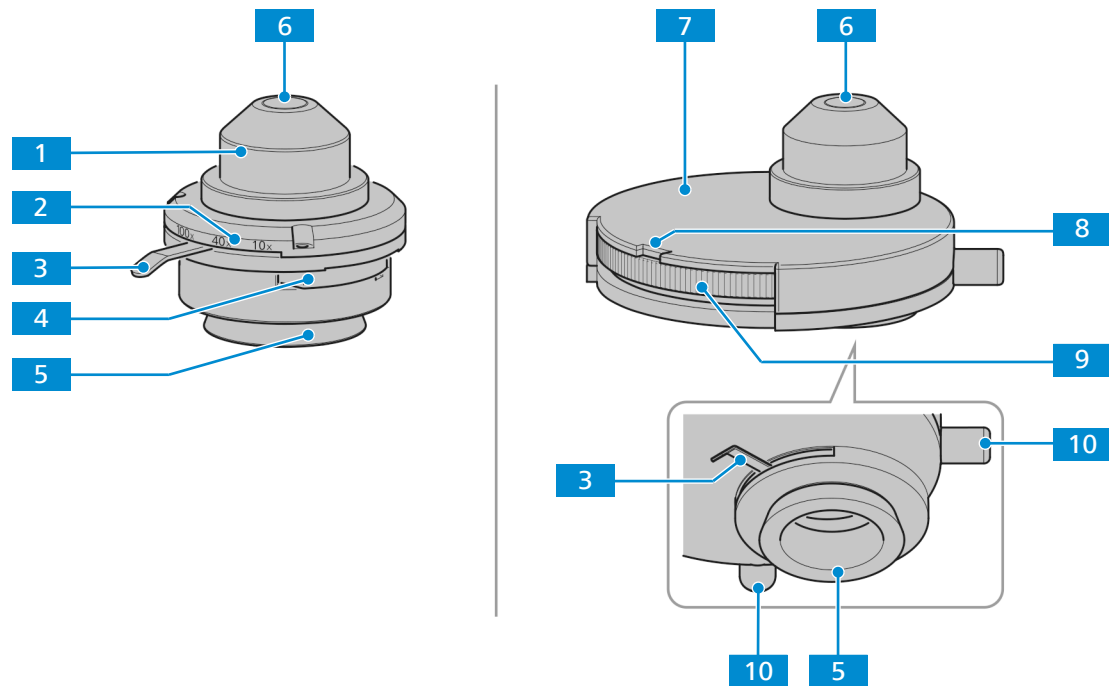


Fig. 27: Abbe condenser and turret condenser

- |  |  |
|--|--|
| <b>1</b> Abbe condenser  | <b>2</b> Magnification marker for aperture setting   |
| <b>3</b> Lever for adjusting the aperture diaphragm  | <b>4</b> Slot for phase contrast or darkfield slider |
| <b>5</b> Dovetail ring mount   | <b>6</b> Front lens                                  |
| <b>7</b> Turret condenser  | <b>8</b> Display field for selected contrast stop    |
| <b>9</b> Turret disk with five positions for:<br>Brightfield <b>H</b><br>Phase contrast <b>Ph1</b> , <b>Ph2</b> , <b>Ph3</b><br>Darkfield <b>D</b> | <b>10</b> Phase ring adjustment holes                |

### 3.2.6 Eyepiece

**Purpose** The eyepieces (10x/20 Br. Foc. and 10x/22 Br. Foc.) serve to observe the microscopic image.

**Position** The eyepieces are inserted into the tube.

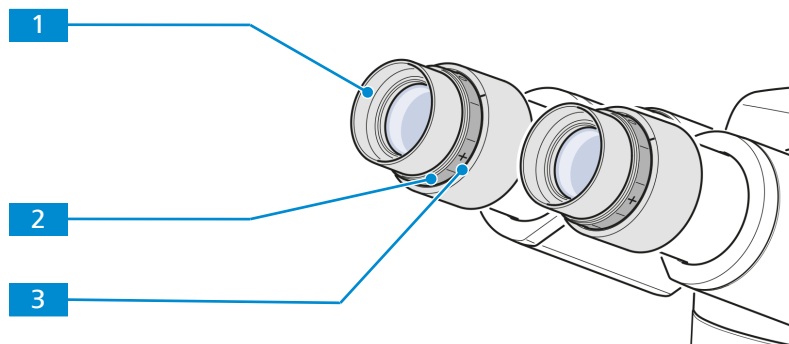


Fig. 28: Eyepiece

- 1** Foldover rubber eyecup
- 2** Focusing ring for compensation of defective vision
- 3** Diopter scale to facilitate finding the correct setting

**Function** Both eyepieces are suitable for spectacle wearers. Additionally, they contain a focusing ring for compensation of defective vision. The provided diopter scale helps to find the correct setting. When using the microscope with the Reflected-Light FL iLED for fluorescence applications, the special eyecups with light protection can be used. However, they cannot be folded over and are not suitable for spectacle wearers.

### 3.2.7 Cable and Screw Tool Storage

The main power cable and phase plate adjustment tools can be stored on the rear side of the microscope.

If reflected light FL iLED is used, the hex key 3 mm can be stored on its rear side.

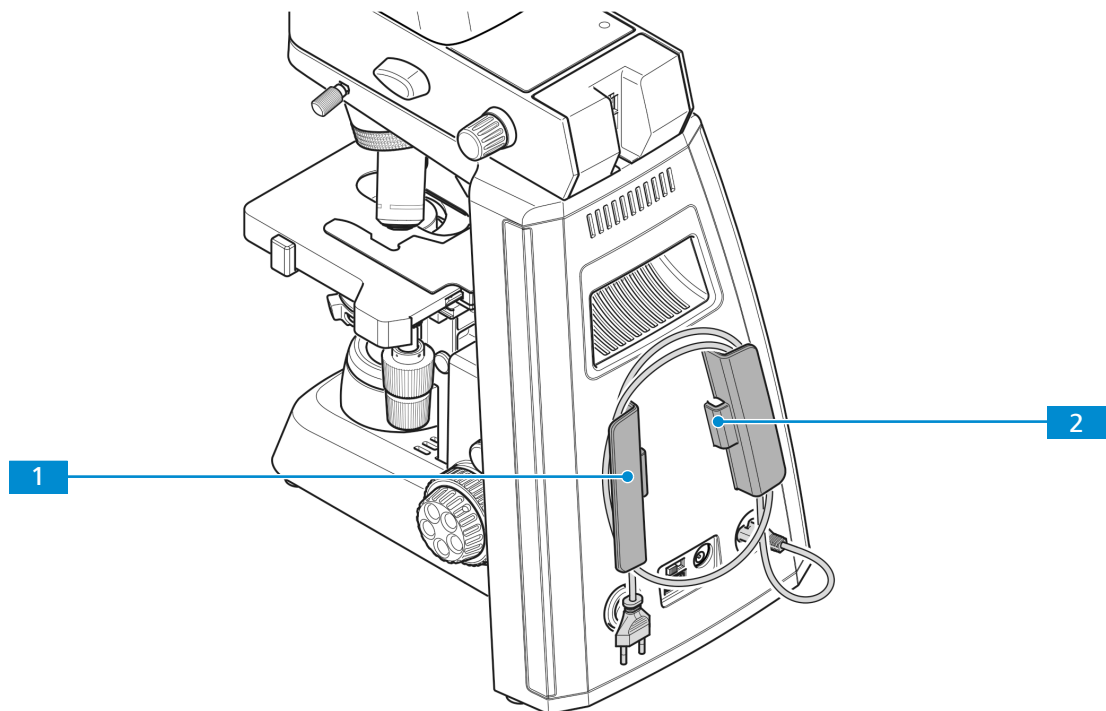
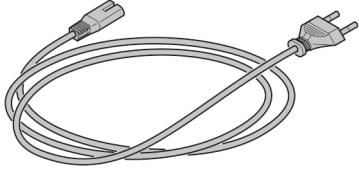
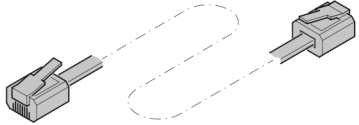

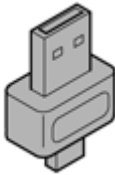
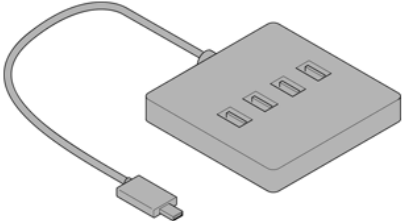


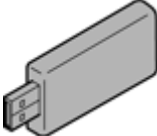


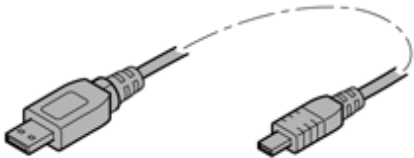

Fig. 29: Storage places

- 1** Holder for power cable
- 2** Storage place for phase plate adjustment tool

### 3.2.8 Accessories for Connecting the Microscope

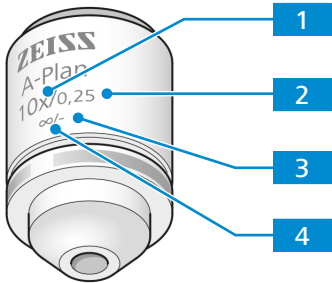
The following connecting cables and accessories are required for voltage supply and use of the ports:

Name	Figure	Remarks
Power cable		Connection between microscope and power outlet
RJ 12 cable		Connection between Binocular tube 25°/22 w/int cam 8 MPx and stand for power supply
HDMI cable (can be ordered in demo kit)		Connection between camera and monitor, TV, or projector
USB flash drive, Type A (not supplied)		Connection to camera for immediate image and video storage
USB hub, Type A (not supplied)		Connection between camera and multiple USB Type-A devices, such as keyboard, mouse and flash drive
Mouse (not supplied)		For control and navigation in the <b>OSD</b> menu
Keyboard (not supplied)		For typing in the <b>OSD</b> menu
USB Wi-Fi adapter (has to be ordered separately)		Connection between the camera and a network or iPad

Name	Figure	Remarks
USB 3.0 cable, Type B to Type A (not supplied)		Connection between camera and PC
Ethernet cable (can be ordered in demo kit)		Connection between camera and network or WLAN router

3.3 Objective Labeling

The functional characteristics of an objective are indicated by the respective labeling, e.g. **A-Plan 10x/0,25 ∞/-**.



Obligatory label components

- 1

**Magnification of the objective (10x)**

The magnification factor specifies the magnification of the objective. Larger magnifications allow to resolve smaller features on the sample.

The objective's magnification factor is also expressed by the objective's color ring.

The objective magnification multiplied by the eyepiece magnification gives the overall magnification.
- 2

**Numerical aperture (NA, 0,25)**

The numerical aperture multiplied by 1000 represents the maximum useful magnification - above that limit no additional resolution is provided.
- 3

**Applicable cover glass thickness (-)**

- : The objective can be used without cover glass or with a cover glass with a thickness of 0.17 mm.

0: The objective should be used without cover glass.

0.17: The objective should be used with a cover glass with a thickness 0.17 mm.
- 4

**Mechanical tube length (∞)**

∞: The objective can be used with tubes of any length.

Additional label components

- Immersion Oil (Oil)**

The objective can be used with immersion oil.
- Phase contrast objective (Ph)**

The objective can be used in phase contrast microscopy.
- Image quality (i)**

The image quality is improved.

**Info**

Due to their short working distance, the following objectives have a resilient mount (specimen protection):

- ▶ 20x
- ▶ 20x/Ph 2
- ▶ 40x
- ▶ 40x/Ph 2
- ▶ 100x dry objective
- ▶ 100x/Ph 3 oil
- ▶ 100x oil

## 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 Safety During Installation

Before installing and starting up the microscope, be sure to carefully read and observe the notes on instrument safety, see *Safety* [▶ 9].

#### NOTICE

##### Pollution of the optics

Dirty optics impair the function of the microscope.

- ▶ Do not touch optical surfaces when unpacking the microscope to avoid fingerprints!

### 4.2 Preparing Installation

The microscope is supplied completely assembled and including accessories that are packed to commercial standards.

Additionally ordered components, such as sliders and the transmitted-light module with illuminating mirror or Reflected-light FL iLED, are delivered in separate packages and must be mounted to the microscope.

- Prerequisite**
- ✓ The floor on which the support/table stands is subject to the least possible vibration.
  - ✓ The surface of the support/table is hard and non-flammable.

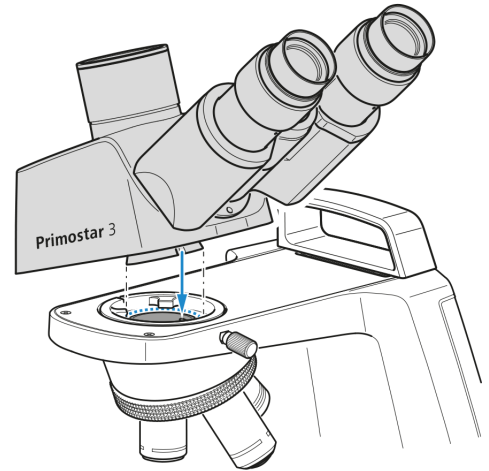
- Procedure**
1. Remove the microscope from the transport case and place it on the work table. The distance of the Microscope to the wall should be at least 9 cm, in order to ensure sufficient air circulation and accessibility of the cabling.
  2. Retain the original packaging for longer-period non-use storage of the instrument or for return to the manufacturer.

## 4.3 Installing Additional Components

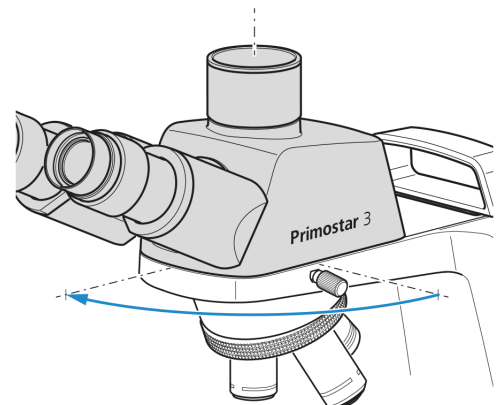
### 4.3.1 Installing or Changing the Tube

**Prerequisite** ✓ The microscope is unplugged from the mains power.

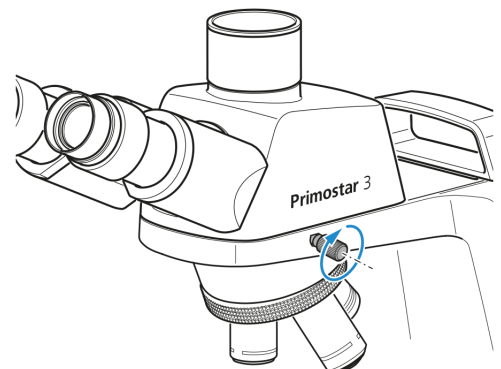
- Procedure**
1. Insert the tube to be installed into the stand.  
→ The eyepieces must point to the right and its dovetail mount must be slightly inclined, under the two holding elements.



2. Place the tube horizontally onto the stand.  
→ The groove on the underside of the tube must be located above the third holding element of the stand.
3. Turn the tube counterclockwise by 90°, align it to the stand.  
→ The eyepieces are pointing frontward.



4. Tighten the knurled clamping screw.



5. To detach the tube, loosen the knurled clamping screw.
6. Turn the installed tube clockwise by approximately 90° and detach it on the right side upward.

**Info**

For space-saving storage of the microscope (e.g. in a cabinet) the tube may also be rotated by 180° to the back.

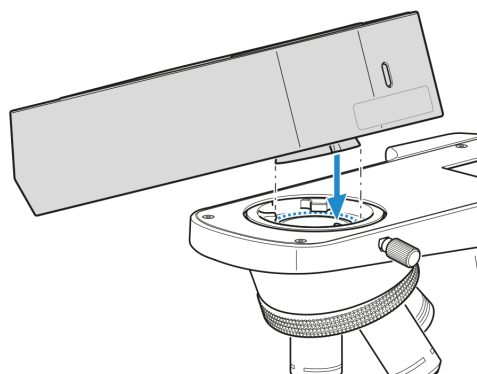
**Info**

For reasons of space, the tube may also be clamped by the Allen set screw supplied with the tube.

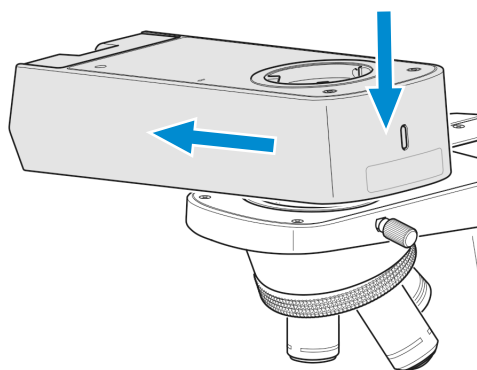
**4.3.2 Installing the Reflected-Light FL iLED onto the Stand**

- Prerequisite**
- ✓ The microscope is unplugged from mains power.
  - ✓ Stand without small hand lift.
  - ✓ RJ12 cable is available.

- Procedure**
1. Insert the Reflected-light FL iLED at correct angle and slightly inclined with its dovetail mount into the stand.

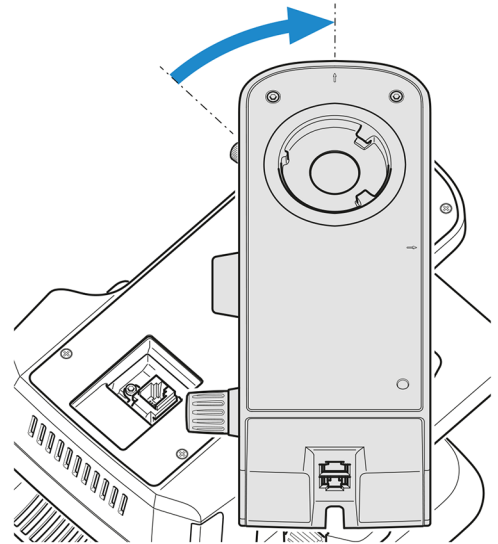


2. Position the Reflected-light FL iLED horizontally.

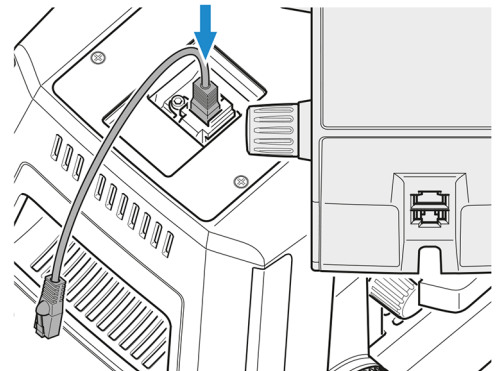




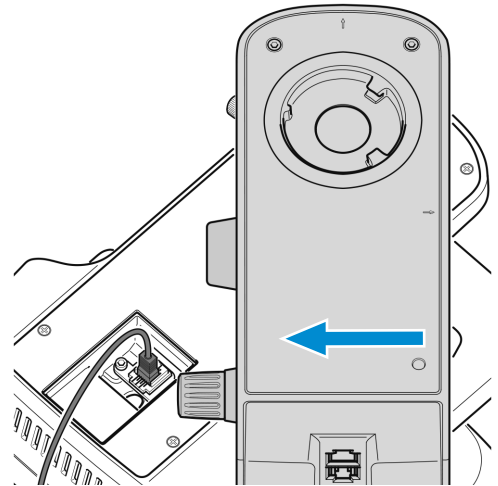
3. Turn the Reflected-light FL iLED clockwise to face backwards with the dovetail mount in the stand.



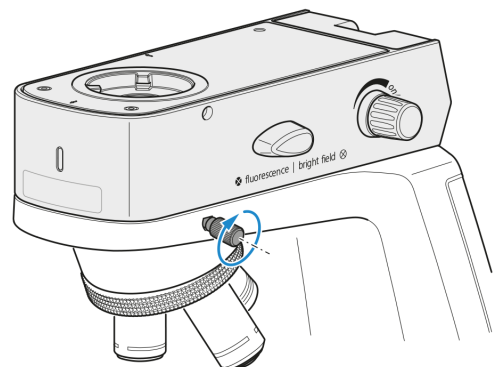
4. Plug the RJ12 cable into the RJ12 female connector port of the stand.



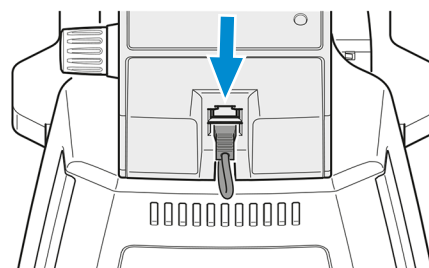
5. Align the Reflected-light FL iLED to the outer edges of the stand.



6. Tighten the set screw of the stand.

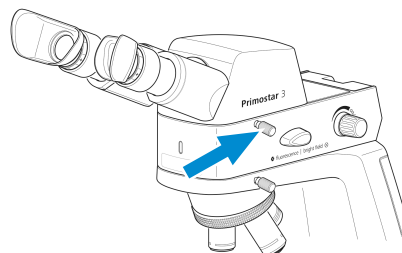


7. Plug the other side of the RJ12 cable into the RJ12 female connector port of the Reflected-light FL iLED.



8. Hide the RJ12 cable at the rear side groove of the Reflected-light FL iLED.

9. Place the tube onto the Reflected-light FL iLED (see *Installing or Changing the Tube* [▶ 43]) and tighten the clamping screw of the Reflected-light FL iLED.



10. If required, place the yellow filter onto the luminous-field diaphragm, see *Assembling the Yellow Filter or the TL Cover Plate (Fixed Köhler Stand)* [▶ 47].

### Info

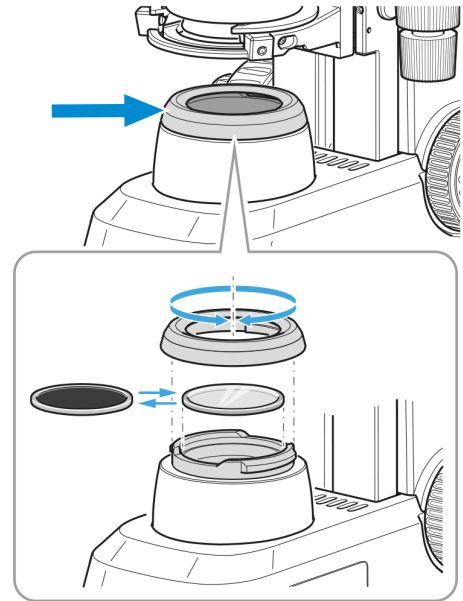
Special eyecups with light protection (see *Changing the Eyecups* [▶ 56]) are used for fluorescence applications if no darkroom is available. However, they cannot be folded over and are, therefore, not suitable for spectacle wearers. For this reason, spectacle wearers should use the standard eyecups.

### Info

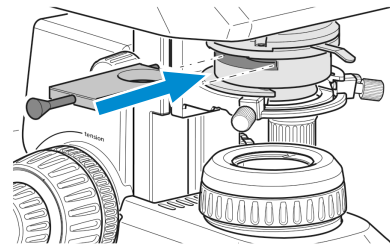
For mounting the Reflected-light FL iLED on stands with small hand lift, please contact an authorized ZEISS service representative.

### 4.3.3 Assembling the Yellow Filter or the TL Cover Plate (Fixed Köhler Stand)

- Procedure**
1. Unscrew the cover cap from the luminous-field diaphragm and remove it.

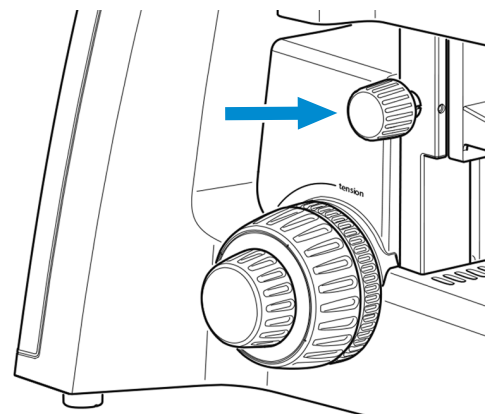


2. Place the yellow filter onto the mounting surface of the luminous-field diaphragm or remove it if necessary.
3. Re-attach the cover cap to the luminous-field diaphragm and lock it.
4. If required, place the TL cover plate into the Abbe condenser phase plate slot.

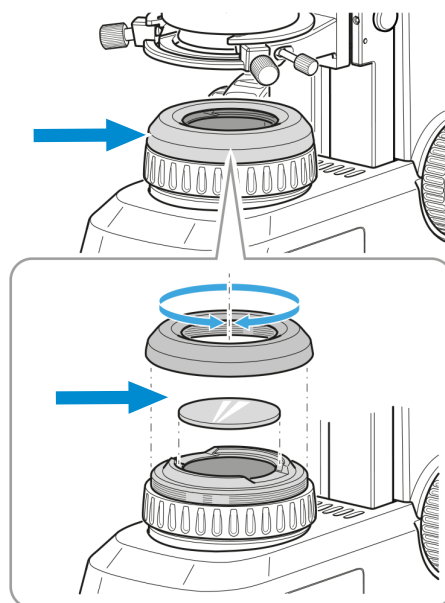


### 4.3.4 Inserting Color Filters (Full Köhler Stand)

- Procedure**
1. Move the condenser carrier up as far as it will go by turning the knurled ring for condenser height adjustment.



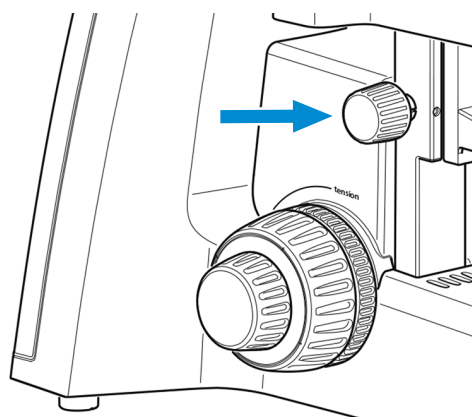
2. Unscrew the cover cap from the luminous-field diaphragm.



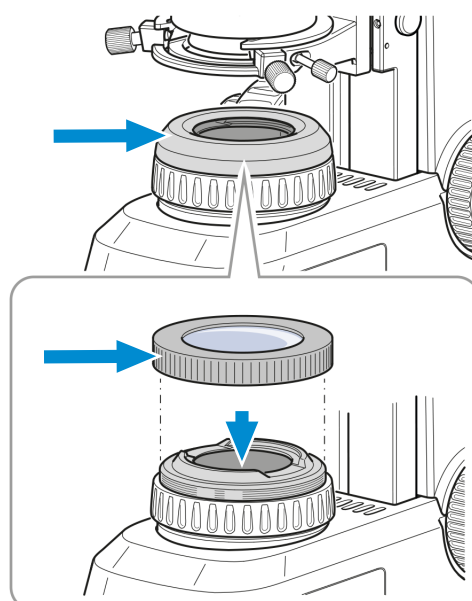
3. Put the desired filter – yellow, green or blue – onto the mounting surface of the luminous-field diaphragm.
4. Screw the cover cap back into place.

#### 4.3.5 Installing the Polarizer Plate (Full Köhler Stand)

- Procedure**
1. Move the condenser carrier up as far as it will go by turning the knurled ring for condenser height adjustment.



2. Unscrew the cover cap from the luminous-field diaphragm and store it for later use.

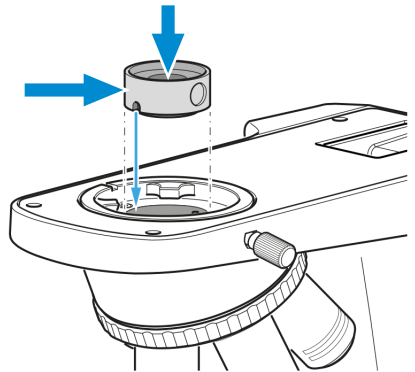


3. Put the polarizer plate onto the luminous-field diaphragm.
  - The position stop on the polarizer plate has to match with the position stop on the luminous-field diaphragm.

#### 4.3.6 Installing the Analyzer Plate

**Prerequisite** ✓ The microscope is unplugged from the mains power.

- Procedure**
1. Remove the tube, see *Installing or Changing the Tube* [▶ 43].
  2. Place the analyzer plate into the beam path on the top on stand.
    - The position stop on the analyzer plate has to match with the position stop on the stand.

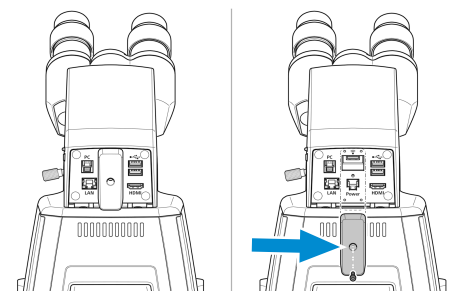


3. Re-attach the tube on the stand.

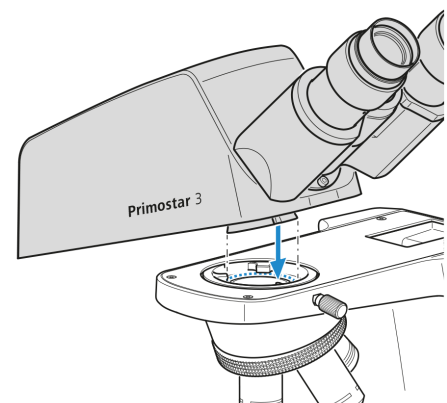
#### 4.3.7 Installing the Binocular Tube 25°/22 w/int Cam 8 MPx

**Prerequisite** ✓ The microscope is unplugged from mains power.  
 ✓ Stand without small hand lift  
 ✓ RJ12 cable  
 ✓ If needed, mount the Reflected-light FL iLED onto the stand first, see *Installing the Reflected-Light FL iLED onto the Stand* [▶ 44]. Then, mount the Binocular tube 25°/22 w/int cam 8 MPx onto the Reflected-light FL iLED in the same way as described below.

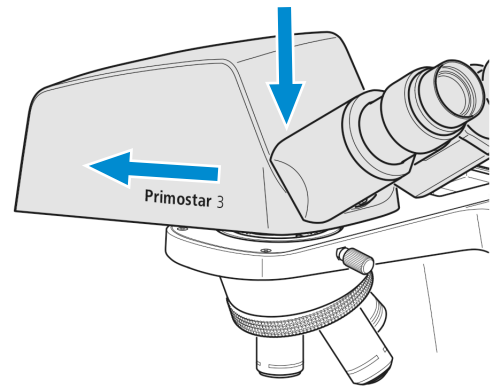
- Procedure**
1. Remove the tube, see *Installing or Changing the Tube* [▶ 43].
  2. Unscrew the cover plate.



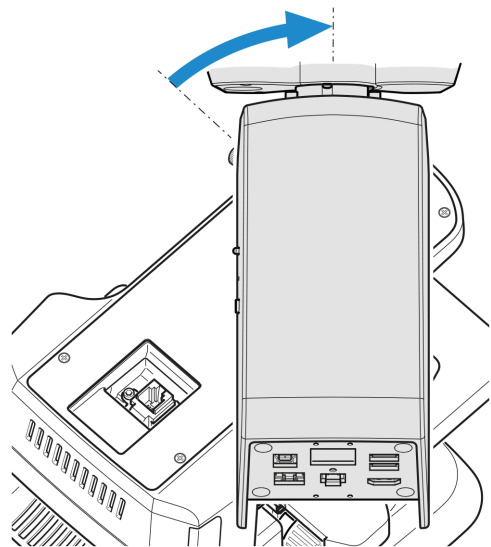
3. Insert the Binocular tube 25°/22 w/int cam 8 MPx, at the correct angle and slightly inclined with its dovetail mount into the stand.



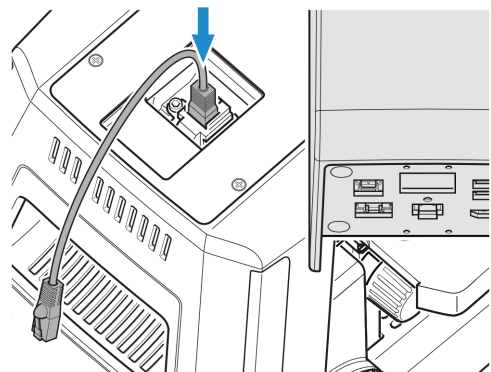
4. Position the Binocular tube 25°/22 w/int cam 8 MPx horizontally.



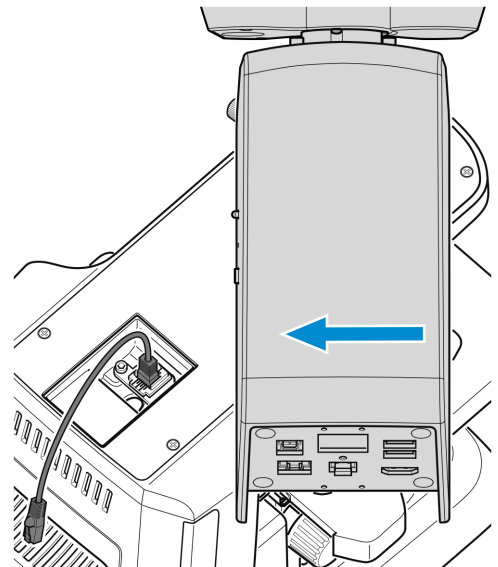
5. Turn the Binocular tube 25°/22 w/int cam 8 MPx clockwise to face backwards with the dovetail mount in the stand.



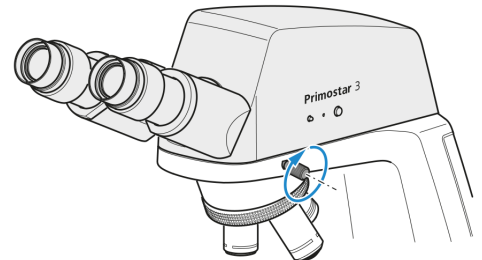
6. Plug the RJ12 cable into the RJ12 female connector port of the stand.  
If the Reflected-light FL iLED is used, plug the RJ12 cable into the upper RJ12 female connector port of the Reflected-light FL iLED.



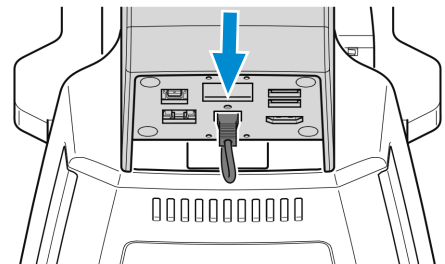
7. Align the Binocular tube 25°/22 w/int cam 8 MPx to the outer edges of the stand.



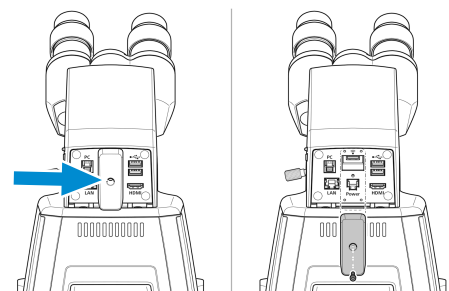
8. Tighten the set screw of the stand.



9. Plug the other side of the RJ12 cable into the RJ12 female connector port of the Binocular tube 25°/22 w/int cam 8 MPx.



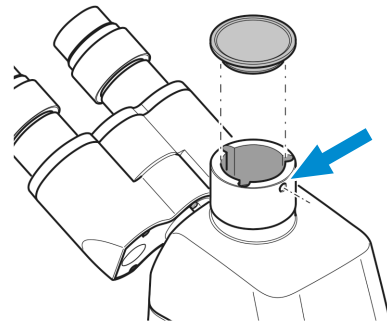
10. Screw on the cover plate. Make sure the RJ12 cable is invisible.



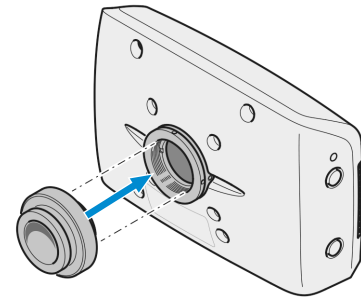
#### 4.3.8 Installing a Camera to the Trinocular Tube

- Prerequisite**
- ✓ A trinocular tube (photo tube) is mounted on the microscope.
  - ✓ A camera adapter P95-C 2/3" 0.65x or P95-C 1/2" 0.5x

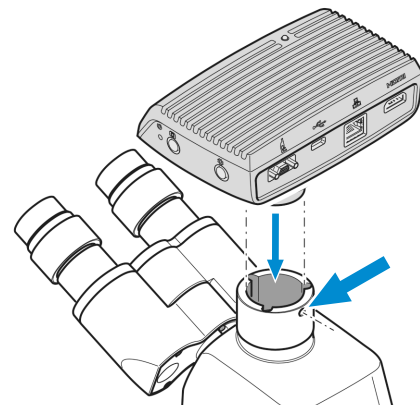
- Procedure**
1. Loosen the clamping screw and remove the dust cap from the tube.



2. Mount the C-mount camera adapter on the camera.



3. Attach the camera with the adapter to the microscope's C-mount port.



4. Orient the camera to the stand and fix its position by tightening the clamping screw.

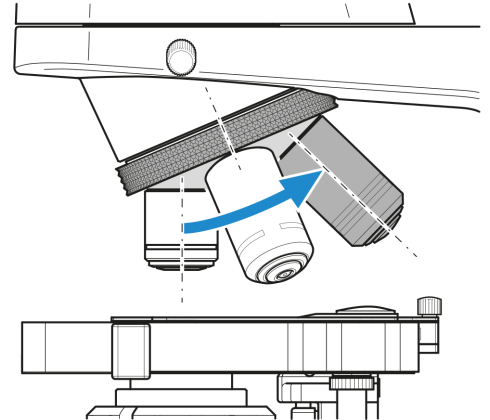
### Info

With camera/adapter combinations that have not been recommended expressly by ZEISS, it may be quite impossible to obtain an unvignetted image.

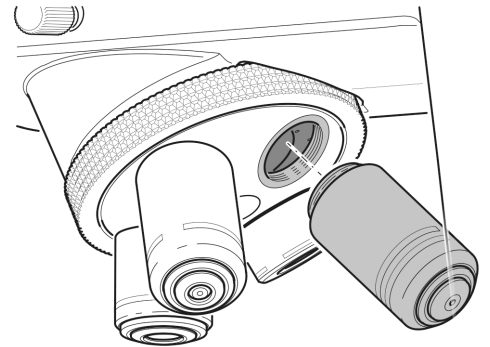


### 4.3.9 Exchanging Objectives

- Procedure**
1. Turn the focusing drive to move the mechanical stage down as far as it will go.
  2. Turn the nosepiece to move the objective to be changed into a lateral position.
  3. Unscrew the objective using the rubber strip included in the delivery and remove it downward.



4. Screw the desired objective handtight into the nosepiece as far as it will go.



5. If you intend to insert the objective in a previously unused lens mount, remove the dust cover from the corresponding mount of the nosepiece.

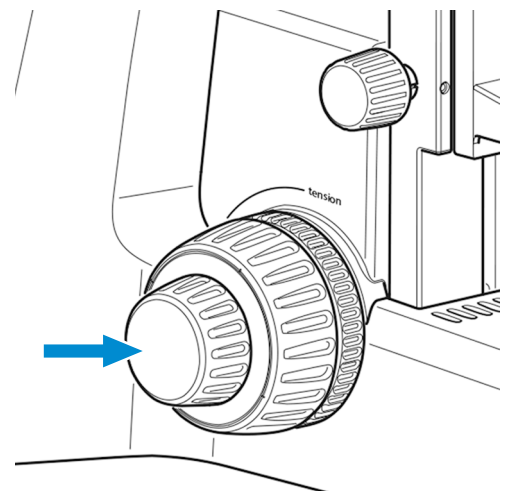
### 4.3.10 Installing/Removing the Condenser

The mirror serves to illuminate the specimen if no power outlet is available.

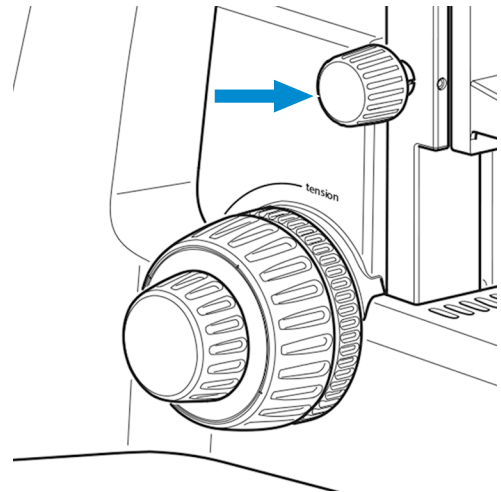
**Parts and Tools**  Hex Key

**Prerequisite**  Full-Köhler stand

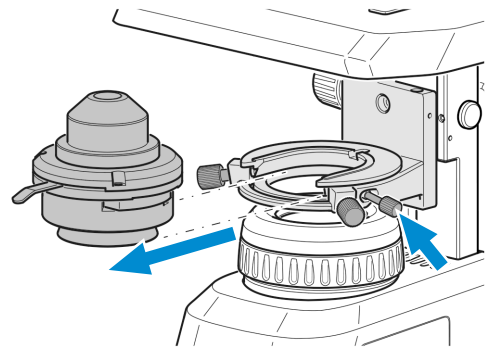
- Procedure**
1. Turn coarse focusing drive to move the stage carrier to the upper stop position.



2. Lower the condenser carrier as far as it will go, using the knurled screw for vertical adjustment.



3. Loosen the clamping screw of the condenser, so that the condenser can be removed forward.
  - Use an Allen wrench if the clamping screw is an Allen screw.




4. Remove the installed condenser, e.g. Abbe condenser.
5. Insert the condenser to be installed, e.g. turret condenser, with its dovetail ring mount into the condenser carrier.
6. Fix it by tightening the clamping screw.

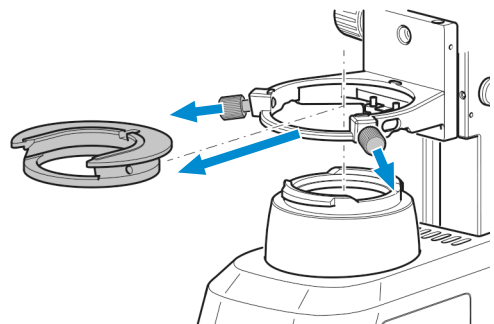
#### 4.3.11 Installing/Removing the Mirror

The mirror serves to illuminate the specimen if no power outlet is available.

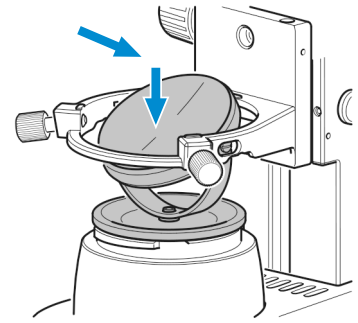
**Parts and Tools**  Hex Key

**Prerequisite**  Fixed-Köhler stand or Full-Köhler stand

- Procedure**
1. Remove the cover cap from the luminous-field diaphragm, see *Assembling the Yellow Filter or the TL Cover Plate (Fixed Köhler Stand)* [► 47].
  2. Remove the condenser, see *Installing/Removing the Condenser* [► 53].
  3. Unscrew the 2 clamping screws from the condenser carrier insert.



4. Push the condenser carrier insert backward against the spring, and inclining it, remove it upward from the condenser carrier.
5. Insert the mirror from the top through the opening of the condenser carrier and place it onto the mount of the luminous-field diaphragm. Take care that the mirror rests horizontally on the mount.



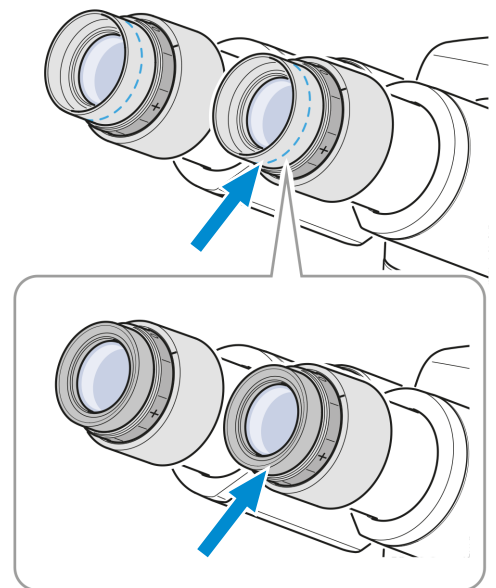
6. Rotate and incline the mirror until the daylight is reflected homogeneously into the light path.

### Info

Follow these instructions in reverse order to remove the mirror.

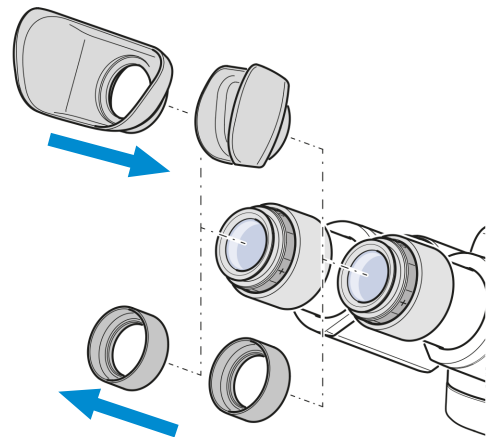
#### 4.3.12 Folding Over the Eyecups

**Procedure** 1. If required, fold over the rubber eyecups.



### 4.3.13 Changing the Eyecups

- Procedure** 1. Remove the existing eyecup from the eyepiece, e.g. the foldover rubber eyecups.



2. Attach the desired eyecups, e.g. the special eyecups with light protection.

## 4.4 Connecting the Microscope to the Power Supply

### 4.4.1 Connecting the Microscope to the Mains Power Supply

All microscopes equipped with Fixed-Köhler stands or Full-Köhler stands can be connected directly to the mains power supply.

**Prerequisite** ✓ The microscope is installed completely with all components to be used.

- Procedure** 1. Plug the power cable **3** into the mains socket **2** of the microscope.

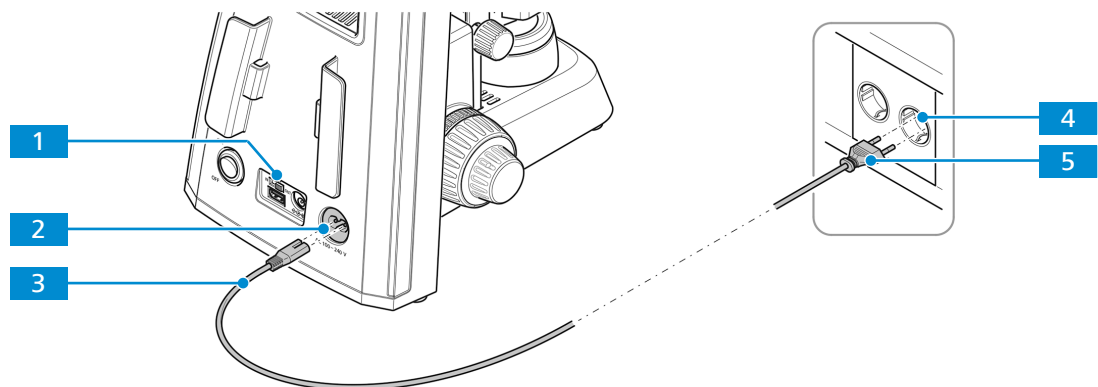


Fig. 30: Connecting the microscope to the mains power supply

2. Make sure the **DC 5V** switch **1** is in the **OUT** position.  
→ The **DC 5V** switch is only available on Fixed-Köhler stands.
3. Plug the other end **5** of the power cable into the mains power supply **4**.

### 4.4.2 Connecting the Microscope to a Power Bank

All microscopes equipped with Fixed-Köhler stands can be connected to a power bank for power supply.

**Prerequisite** ✓ The microscope is installed completely with all components to be used.  
✓ The mobile power bank is charged.

- Procedure** 1. Plug the USB Type A to A cable **3** into the 5V USB port **2** of the microscope.

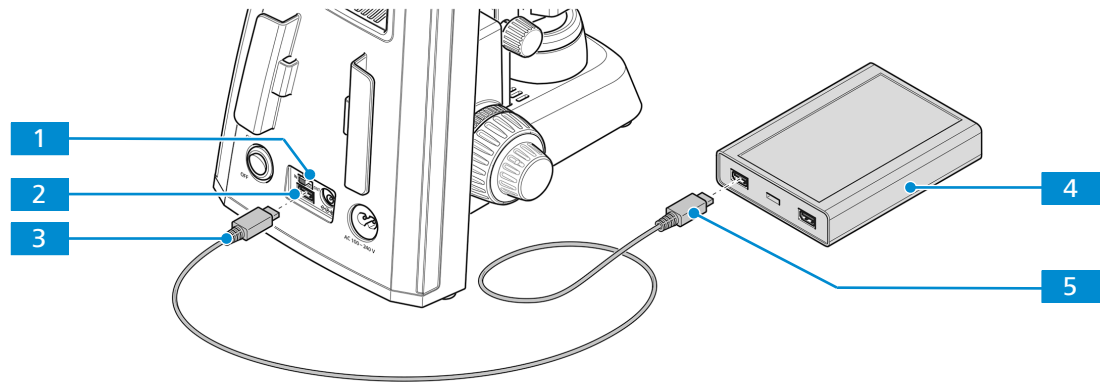


Fig. 31: Connecting the microscope to a power bank

2. Switch the **DC 5V** switch **1** to the **IN** position.
3. Plug the other side of the USB Type A to A cable **5** into the appropriate port of the power bank **4**.

## 4.5 Connecting the Binocular Tube 25°/22 w/int Cam 8 MPx to External Devices

The Binocular tube 25°/22 w/int cam 8 MPx can be connected to various external devices.

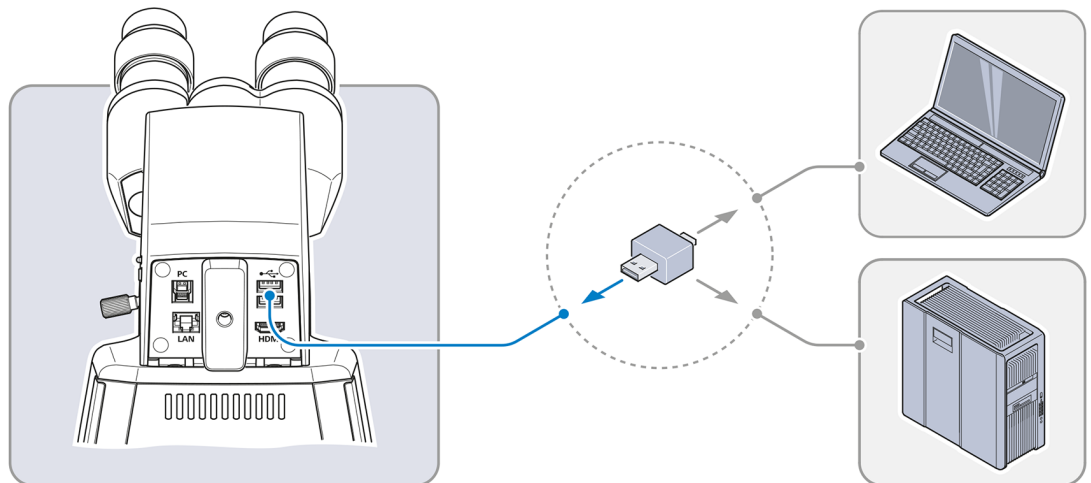
The following options are available:

- *Connecting a USB Flash Drive [▶ 57]*
- *Connecting to the PC via USB 3.0 Port [▶ 58]*
- *Connecting to a Display (without PC) [▶ 58]*
- *Integrating the Binocular Tube 25°/22 w/int Cam 8 MPx into a Network [▶ 59]*

### 4.5.1 Connecting a USB Flash Drive

**Prerequisite** ✓ The USB flash drive has to be of FAT32 format and have enough free space for storing the data

- Procedure** 1. Insert the flash drive into one of the USB Type A ports of the Binocular tube 25°/22 w/int cam 8 MPx.



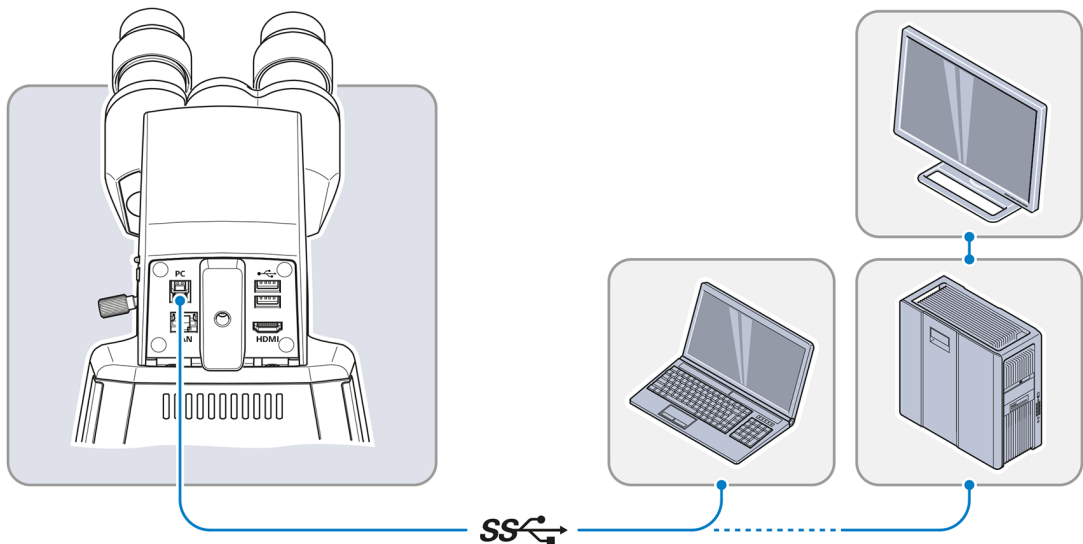
**Info**

To view the captured images or videos connect the USB flash drive to a PC or laptop.

**4.5.2 Connecting to the PC via USB 3.0 Port**

- Prerequisite**
- ✓ USB 3.0 specification defined as maximum: 500 mA / USB port
  - ✓ A USB 3.0 (Type B and Type A) cable is required

- Procedure**
1. Insert the USB 3.0 cable connector into the fast Ethernet port (RJ45).



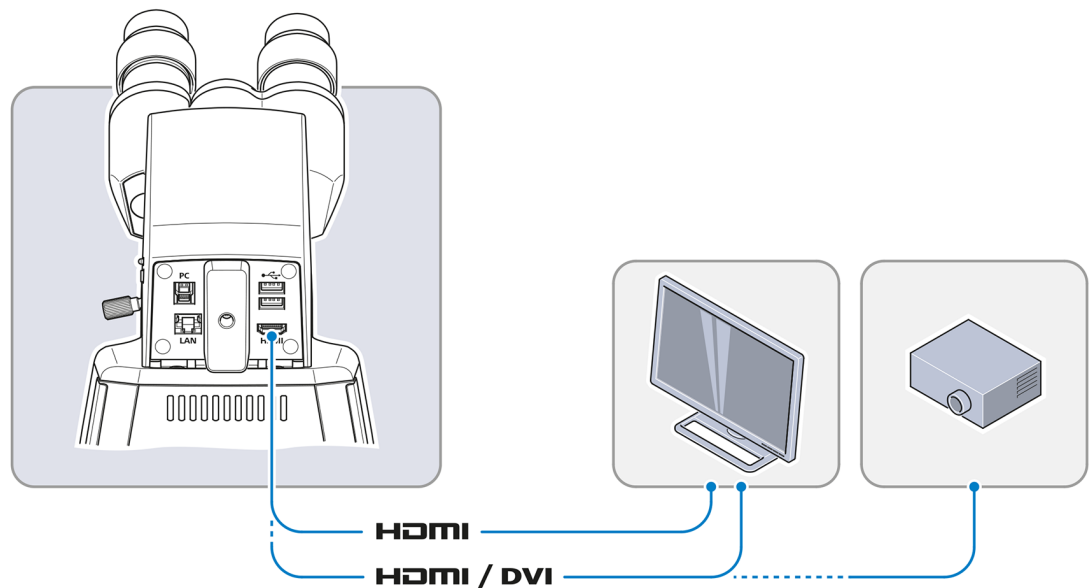
2. Insert the other USB 3.0 cable connector into the corresponding socket of the PC or laptop.

**4.5.3 Connecting to a Display (without PC)**

The Binocular tube 25°/22 w/int cam 8 MPx can be connected to a monitor, TV or projector for visualization of the live image data and for operating the On Screen Display menu (OSD) functions.

- Prerequisite**
- ✓ The monitor/projector supports 1080p and 4K HD formats.
  - ✓ To enable the display in HD quality, it is recommended that only HD-capable devices are connected.
  - ✓ If connecting to a monitor, use a monitor that supports 4K for live imaging at 4K resolution (e.g. Monitor TFT 32" HP Z32)
  - ✓ If a monitor/projector is used, an HDMI/DVI adapter cable or HDMI/DVI adapter is required for the reproduction of image data.

- Procedure**
1. Connect the monitor/projector to the Binocular tube 25°/22 w/int cam 8 MPx using the HDMI cable.



2. Secure the HDMI plug on the jack of the monitor/projector.
3. Set the display device's aspect ratio to 16:9 or Aspect.

#### 4.5.4 Integrating the Binocular Tube 25°/22 w/int Cam 8 MPx into a Network

The Binocular tube 25°/22 w/int cam 8 MPx is able to communicate and transfer data to network via Ethernet port or Wi-Fi adapter and work with the **ZEISS Labscope** app.

A WLAN router is required to use the built-in camera together with the **ZEISS Labscope** app.

An existing WLAN infrastructure or a separate microscope WLAN setup may be used.

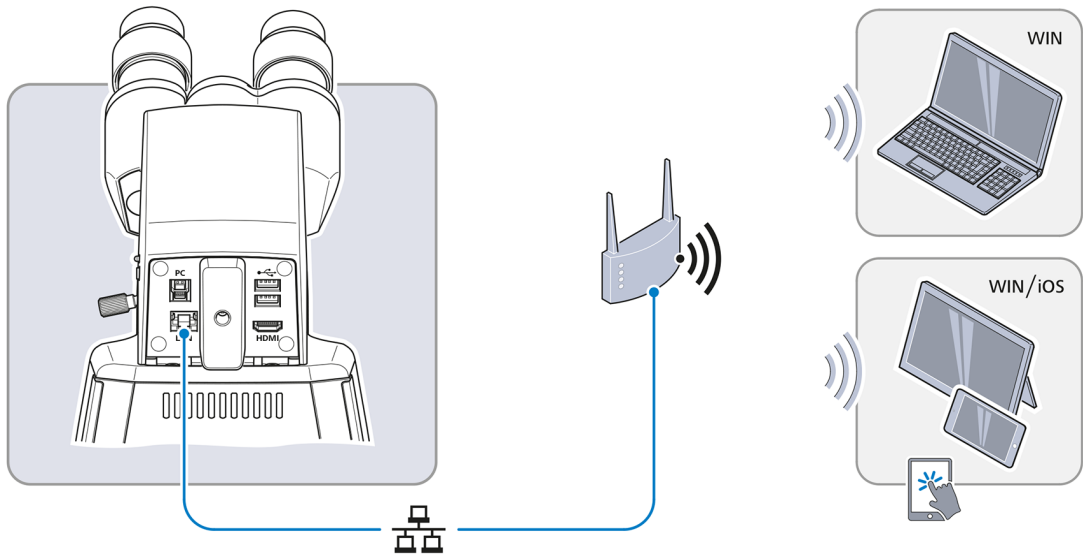
To use an existing WLAN infrastructure, a High-performance 802.11n WLAN with sufficient free bandwidth is required. In the event of an overloaded or slow WLAN the live image of the built-in camera may be delayed or incorrectly displayed on the iPad.

To create a separate microscope WLAN set up, visit [www.zeiss.com/micro-apps](http://www.zeiss.com/micro-apps) for further information.

The integrated camera will identify itself automatically to the network on DHCP and will be automatically recognized by **Labscope**, provided the iPad is in the same network.

#### 4.5.4.1 Connecting the Binocular Tube 25°/22 w/int Cam 8 MPx via Ethernet

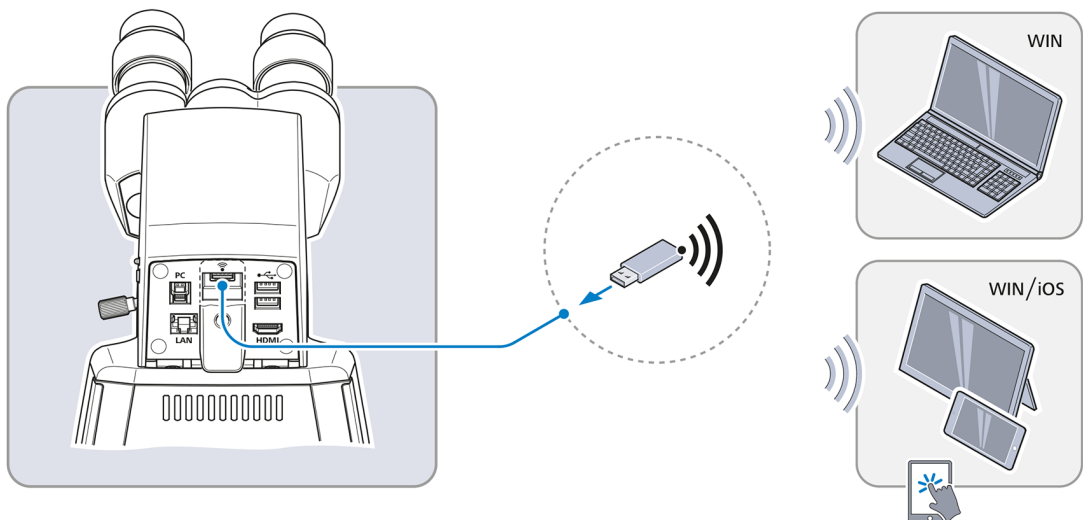
- Procedure**
1. Insert the Ethernet cable into the jack on the reverse side of the Binocular tube 25°/22 w/int cam 8 MPx.



2. Insert the Ethernet cable's opposite connector into the corresponding socket on your WLAN router.
3. Switch on the router.
  - **Labscope** can recognize the network (network name and password are the same as in the WLAN router setting).

#### 4.5.4.2 Connecting the Binocular Tube 25°/22 w/int Cam 8 MPx via Wi-Fi Adapter

- Procedure**
1. Unscrew the plastic cover plate.



2. Insert the Wi-Fi adapter into the USB type A port.
3. Replace the plastic cover plate and lock it with a screwdriver.
  - **Labscope** can recognize the network (Network name: Primostar 3\_last six numbers from MAC address (MAC address label is on top of the Binocular tube 25°/22 w/int cam 8 MPx, for example **Primostar3\_F9A919**)  
Password: ZEISS1846



**Info**

When a compatible USB Wi-Fi adapter is inserted into the Binocular tube 25°/22 w/int cam 8 MPx, the **Wi-Fi Settings** menu will be displayed. It offers advice for connecting the camera to a Wi-Fi device (e.g. iPad or PC).

**Info**

Consult your network administrator for further guidance.

Further information of all ZEISS Microscopy apps can be found at <https://www.zeiss.com/microscopy/int/products/microscope-software/microscopy-apps.html>.

## 4.6 Installing Labscope Software for Using the Binocular Tube 25°/22 w/int Cam 8 MPx

To capture images with the Binocular tube 25°/22 w/int cam 8 MPx, you have the following options:

- Installation of **Labscope** for Windows to PC
- Installation of **Labscope** to iPad

### 4.6.1 Installing the Labscope Software on PC

**Prerequisite** ✓ WINDOWS PC is required.

- Procedure**
1. Go to [www.zeiss.com/labscope](http://www.zeiss.com/labscope) for free download.
  2. Install the Labscope App as described.

### 4.6.2 Installing the Labscope App on iPad

**Prerequisite** ✓ iPad is required.

- Procedure**
1. Go to the App Store.
  2. Search for **Labscope** by ZEISS.
  3. Install the app as described.

## 5 Operation

This chapter describes switching on/off the microscope as well as the first 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:

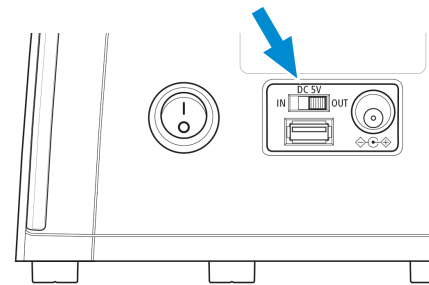
- The Instruction Manual was read prior to commissioning or operation and kept for further use.
- The chapter **Safety** was read and understood.
- The operator is acquainted with the general Windows®-based programs.
- If required: Basic training and safety briefing were successfully completed.

### 5.2 Switching On the Microscope

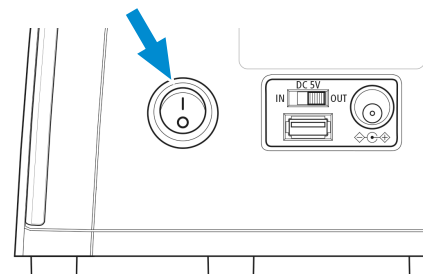
#### 5.2.1 Switching On the Microscope with Mains Power Connection

**Prerequisite** ✓ *The microscope is connected to the mains power supply [▶ 56].*

- Procedure**
1. At the Fixed-Köhler stand, set the **DC 5V** switch to the **OUT** position.



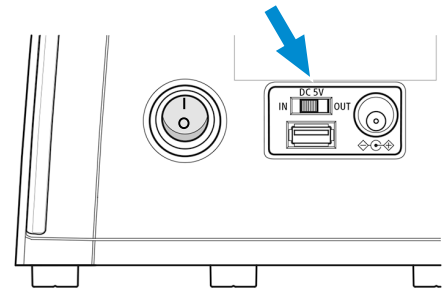
2. Switch on the **main power ON/OFF** button.



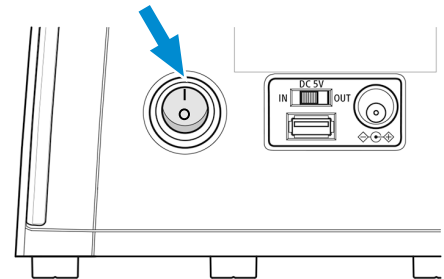
#### 5.2.2 Switching On the Microscope with Power Bank Connection

- Prerequisite**
- ✓ *The microscope is connected to the power bank [▶ 56].*
  - ✓ *The power bank is charged.*

**Procedure** 1. Set the **DC 5V** to the **IN** position.



2. Switch on the power bank.
3. Switch on the **main power ON/OFF** button.



## 5.3 Adjusting the Tube

This procedure consists of the following steps:

**Prerequisite** ✓ The microscope is connected to the mains and is switched on.

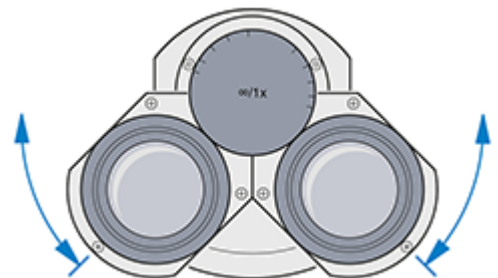
- Procedure**
1. *Adjusting the Position of the Eyepieces* [▶ 63]
  2. *Adjusting the Eyepiece with Eyepiece Pointer or Eyepiece Micrometer* [▶ 64]

### 5.3.1 Adjusting the Position of the Eyepieces

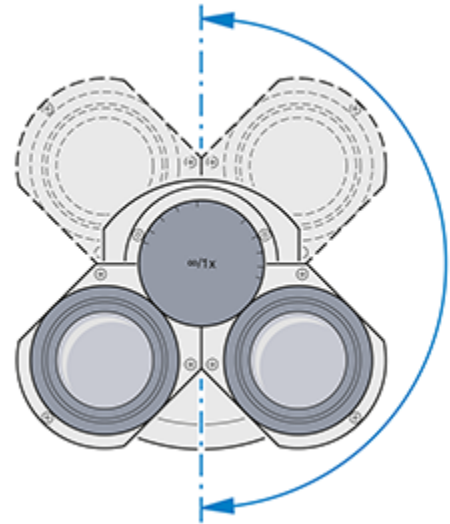
#### Info

The adjustment of the interpupillary distance is correct when you see only one round image while looking through the two eyepieces.

- Procedure**
1. Set the interpupillary distance by rotating the eyepiece tubes symmetrically toward or away from one another.

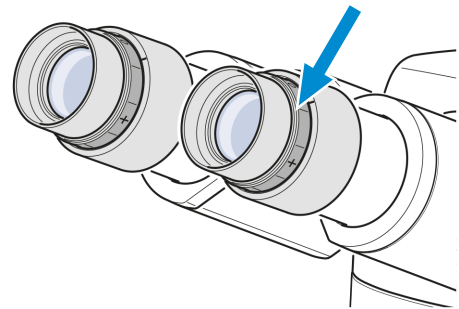


2. Set the viewing height by swivelling the eyepieces a full 180° upwards or downwards.

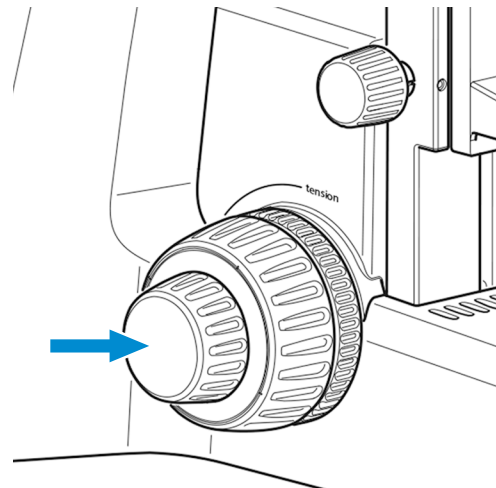


### 5.3.2 Adjusting the Eyepiece with Eyepiece Pointer or Eyepiece Micrometer

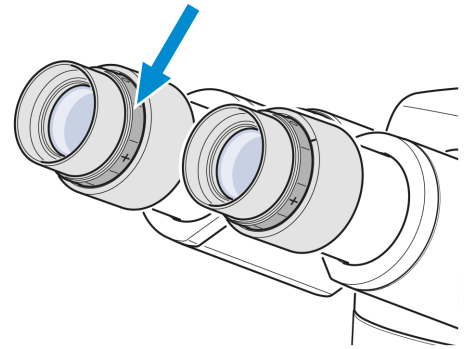
- Procedure**
1. Put the eyepiece with pointer or micrometer into the tube and fix it with the set screw.
  2. Turn the focusing ring of the eyepiece to focus on the wedge-shaped figure of the eyepiece pointer.



3. Put the specimen onto the mechanical stage.
4. Look at the specimen through the eyepiece with the eyepiece pointer or micrometer.
5. Use the focus drive to bring the microscopic image into focus until both the microscopic image and the eyepiece pointer are sharply defined.



6. Focus the image for the second eye by turning the focusing ring of the second eyepiece.



- ↳ Having done so, both microscopic images inclusive of the eyepiece pointer or micrometer are focused.

### Info

Afterwards, you should focus on the specimen using the focusing drive only.

## 5.4 Adjusting the Transmitted-Light Brightfield on the Full-Köhler Microscope

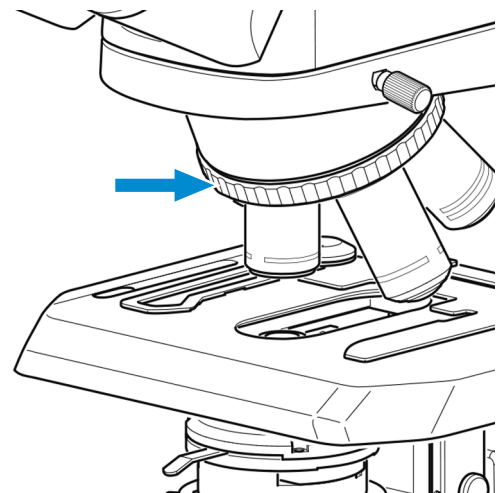
**Parts and Tools** 🔧 High contrast specimen slide with cover glass of 0.17 mm thickness

### Info

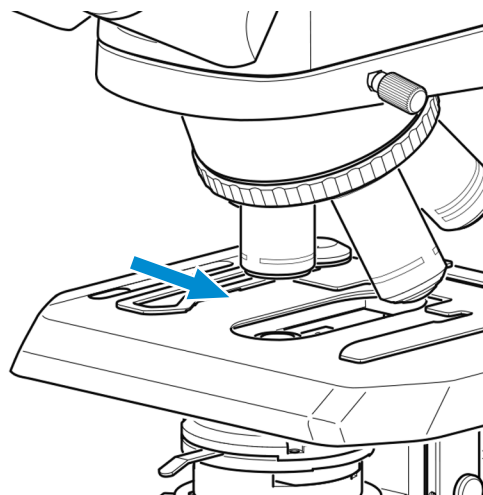
The knurled knob for the vertical condenser adjustment is always on the side opposite to the stage controls.

- Prerequisite** ✓ The microscope is adapted to the user, see *Adjusting the Tube* [▶ 63].  
 ✓ A 10x objective for use with cover glass of 0.17 mm thickness is mounted.

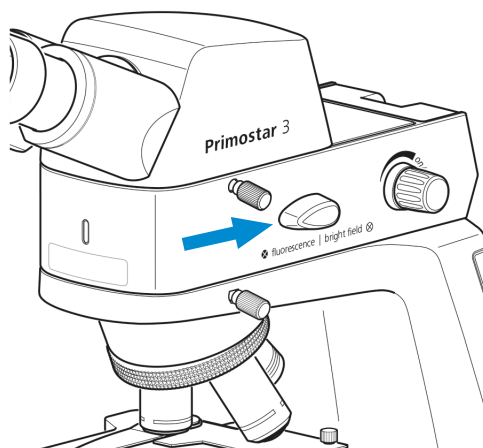
- Procedure** 1. Rotate the 10x objective into the light path using the knurled ring of the nosepiece.



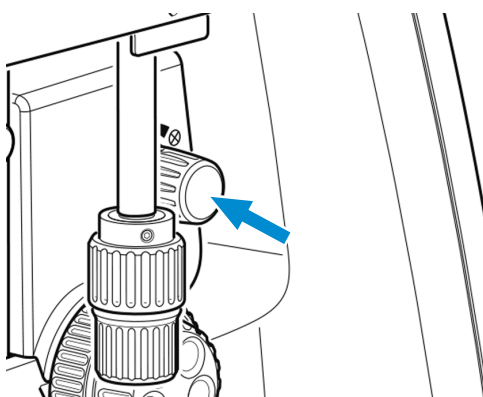
2. Place the high-contrast specimen slide on the stage and fix it using the spring lever of the specimen holder.



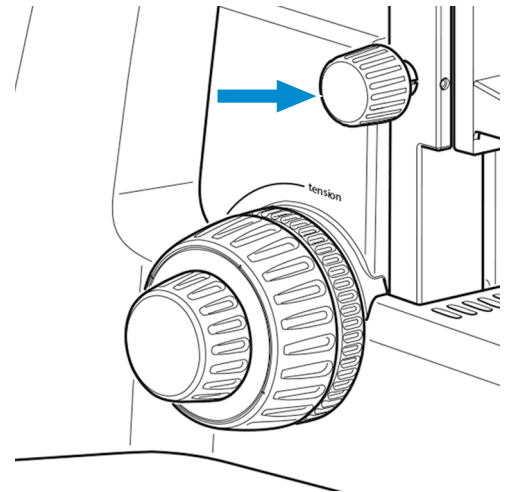
3. If applicable, move all phase contrast or darkfield elements out of the light path.
4. If the microscope stand is equipped with the turret condenser, move turret to **BF** position.
5. When using the Reflected-light FL iLED, turn the **fluorescence/brightfield** changeover switch to the **brightfield** position (turn the switch fully upward first).



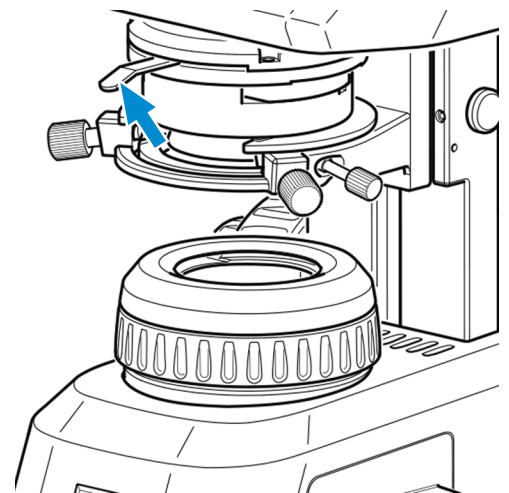
6. Use the rotary knob for illumination intensity to adjust the illumination to a comfortable setting.



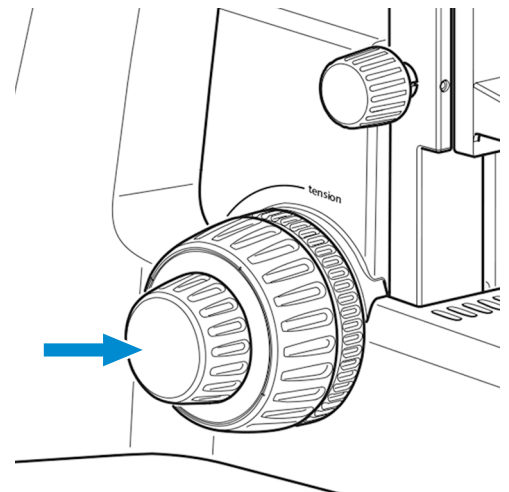
7. Use the knurled knob for vertical condenser adjustment to move the condenser to the upper limit stop.



8. Use the control lever of the aperture diaphragm to set the aperture diaphragm to the middle position.



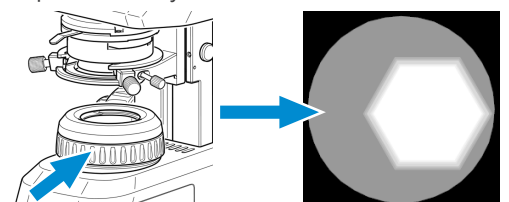
9. Look through one eyepiece and use the focusing drive to bring the specimen into focus.



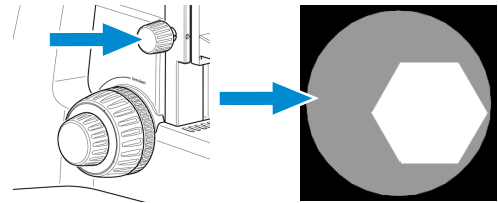
10. If necessary, readjust the image sharpness for the other eye by turning the adjustable eyepiece.

→ The image of the high-contrast specimen is sharp for both eyes.

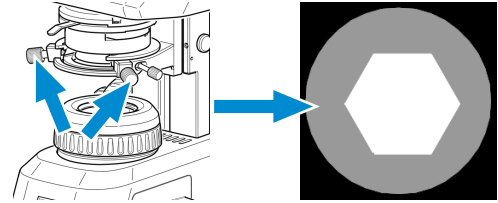
11. Close the luminous-field diaphragm until its edges become visible in the field of view.



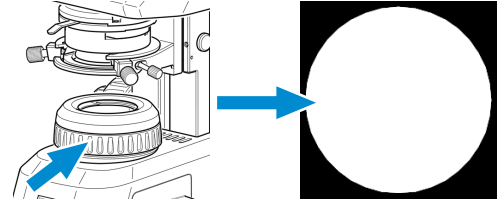
12. Use the knurled knob for vertical adjustment to slowly move the Abbe condenser downwards until the edge of the luminous-field diaphragm becomes sharp.



13. Use the centering screws to center the image of the luminous-field diaphragm in the field of view.



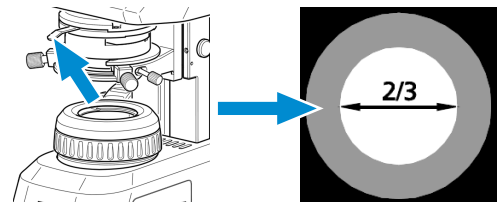
14. Open the luminous-field diaphragm until its edges just disappear from the field of view.



15. To adjust the contrast, remove one eyepiece from the tube and look through the tube.

16. Use the control lever of the aperture diaphragm to adjust the aperture diaphragm to approximately 2/3 to 4/5 of the diameter of the exit pupil of the objective.

- The optimum contrast at almost ideal resolution for most applications (best compromise for the human eye) is set.



17. Reinsert the eyepiece into the tube.

### Info

The size of the field of view and the objective aperture change with every objective change. Therefore, the adjustment of the luminous-field diaphragm and the aperture diaphragm according to Köhler has to be repeated to obtain optimum microscopy conditions.

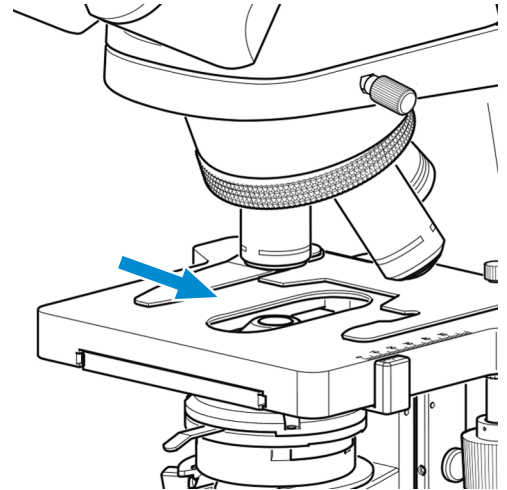
## 5.5 Adjusting the Transmitted-Light Brightfield on the Fixed-Köhler Microscope

The Fixed-Köhler microscope is supplied factory-adjusted. The operation is restricted to a few manipulations.

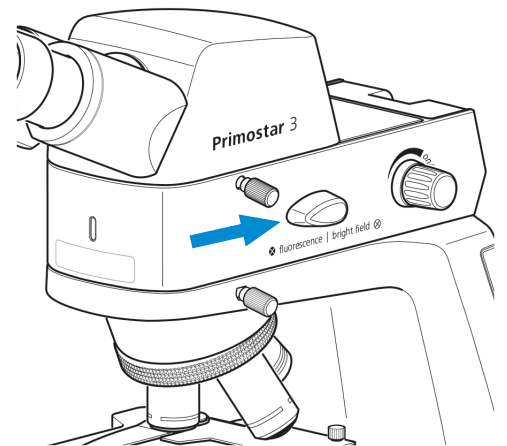
**Prerequisite** ✓ The microscope is adapted to the user, see *Adjusting the Tube* [► 63].



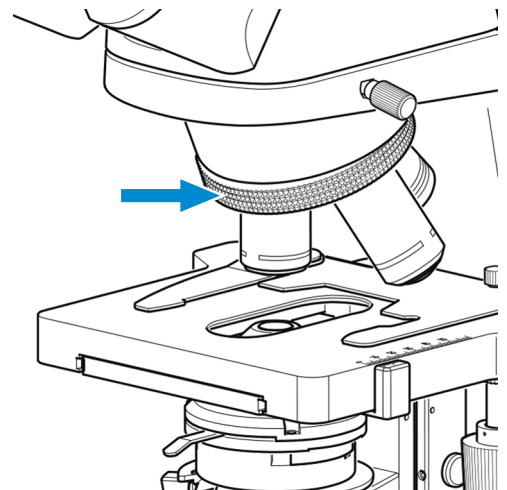
- Procedure**
1. Place the specimen in the specimen holder of the mechanical stage.



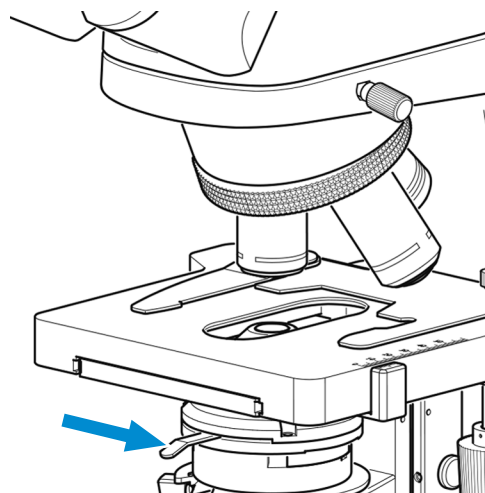
2. If the microscope stand is equipped with a dark-field slider, pull this slider to the left up to the lock-in position.
3. When using the Reflected-light FL iLED, turn the **fluorescence/brightfield** changeover switch to the **Brightfield** position (turn the switch fully upward first).



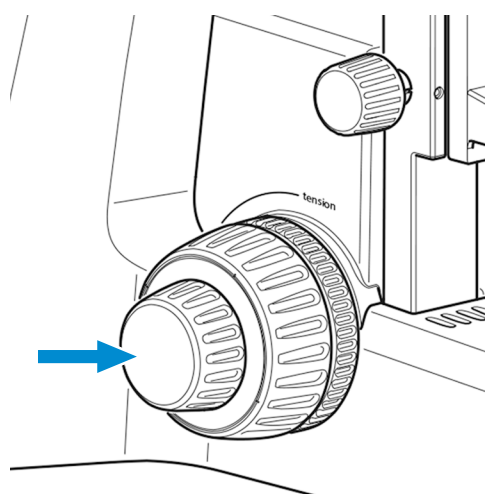
4. Push the slider containing the yellow filter with its filter position into the light path.
5. Adjust to the desired magnification by rotating the corresponding objective into the light path.



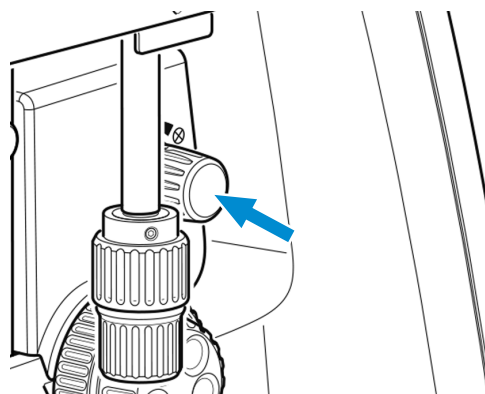
6. Set the control lever of the condenser aperture diaphragm to the value of the selected magnification (**10x**, **40x** or **100x**).



7. Focus on the specimen using the focusing drive.



8. Use the rotary knob for illumination intensity to adjust the illumination to a comfortable setting.



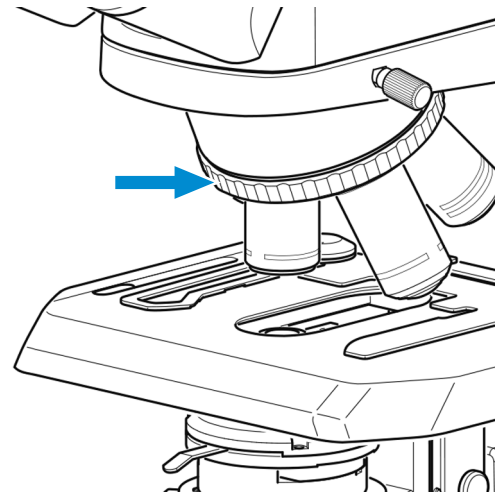
If the condenser has been removed (e.g. for installing the illuminating mirror), make sure to re-install and center it using the two centering screws, see *Installing/Removing the Mirror* [▶ 54].

## 5.6 Adjusting the Transmitted-Light Phase Contrast or the Transmitted-Light Darkfield Using a Contrast Slider

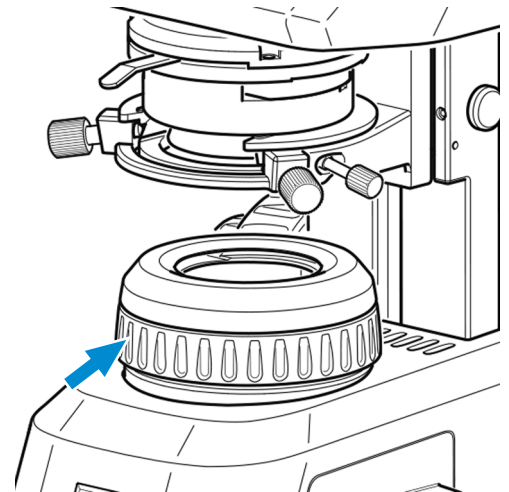
**Parts and Tools** 🔧 2 x Hex key, 1.5 mm

- Prerequisite**
- ✓ The phase contrast method on the microscope requires a stand with Full-Köhler equipment.
  - ✓ Contrast slider for phase contrast or darkfield.

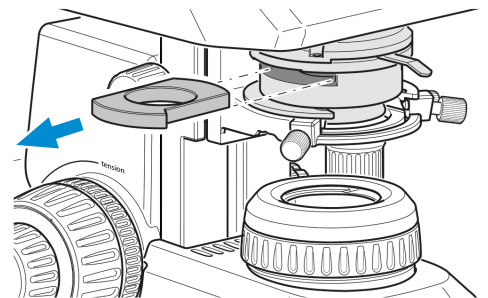
- Procedure**
1. Adjust the microscope as you would for transmitted-light brightfield, see *Adjusting the Transmitted-Light Brightfield on the Full-Köhler Microscope* [▶ 65].
  2. Turn the nosepiece to move the phase contrast objective (**Ph 2**) into the light path.



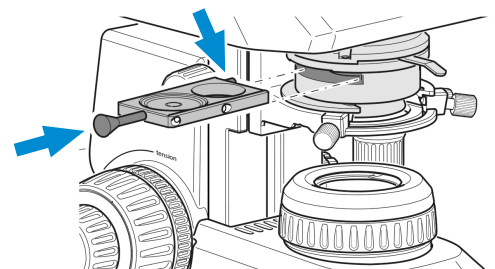
3. Open the luminous-field diaphragm on the stand.



4. Remove the dummy slider from the Abbe condenser.

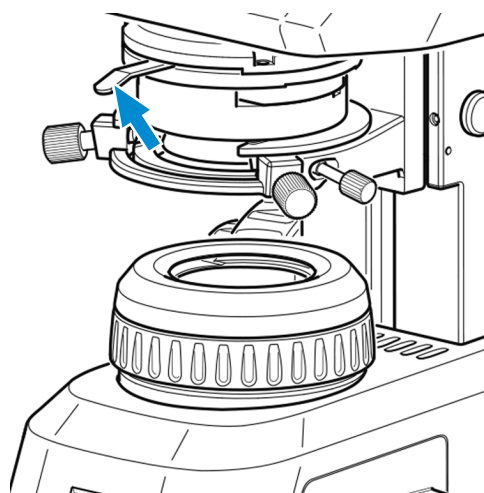


5. Remove the locking screw from the phase contrast slider (fitting the objective used, **Ph 2**). Push the phase contrast slider from the left into the Abbe condenser until it reaches the lock-in position.

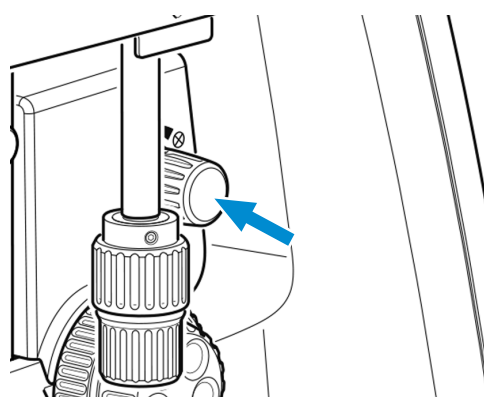


6. Screw the locking screw into the contrast slider.

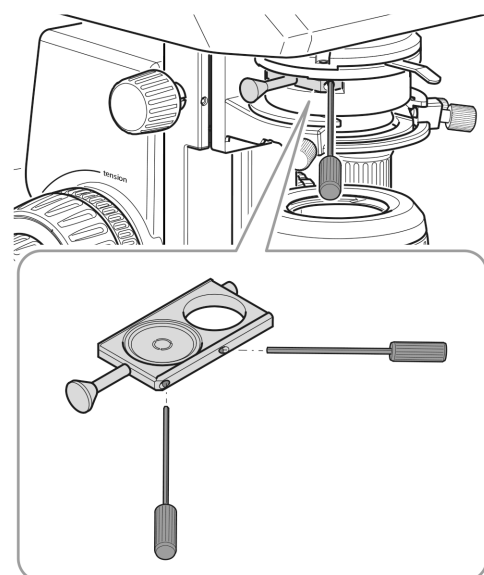
7. Fully open the aperture diaphragm of the Abbe condenser using its control lever (left limit stop).



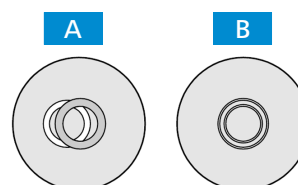
8. Adjust the illumination intensity as required.



9. To center the phase stop, remove one eyepiece and replace it with the diopter or telescope.
10. If it is necessary to center the phase stop, insert the two Allen wrenches into the adjusting screws of the phase slider.



11. Center the phase stop from position **A** to position **B** by turning the two adjusting screws of the slider using the two Allen wrenches.



12. Afterwards, replace the diopter or telescope with the eyepiece again.

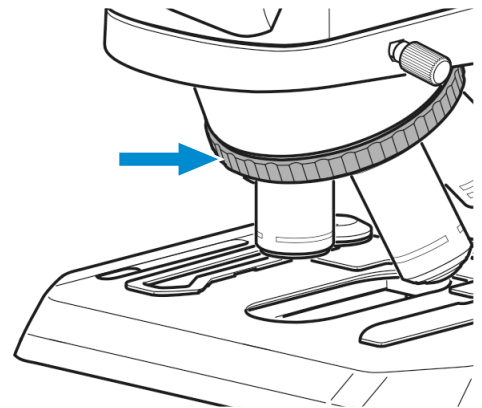
**Info**

For darkfield application, use the darkfield slider instead of the phase contrast slider.

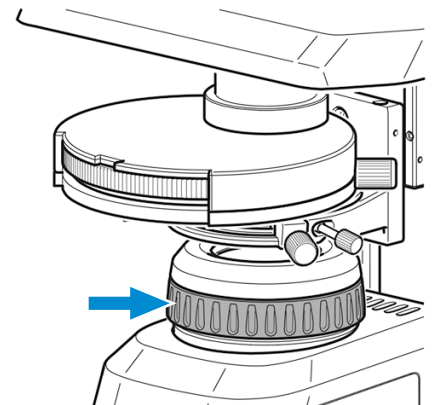
## 5.7 Adjusting the Transmitted-Light Phase Contrast or the Transmitted-Light Darkfield Using the Turret Condenser

- Prerequisite**
- ✓ The phase contrast method on the microscope requires a stand with Full-Köhler equipment..
  - ✓ The turret condenser with phase contrast stop or darkfield stop inserted is required.
  - ✓ The microscope is adjusted for *transmitted-light brightfield* [▶ 65].

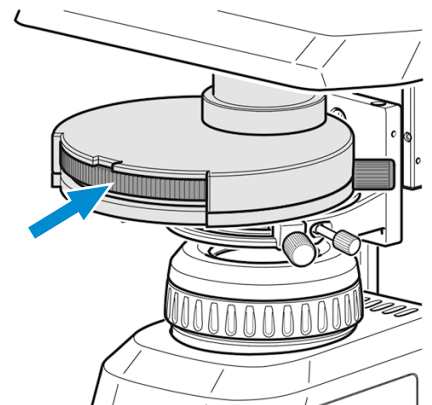
- Procedure**
1. Turn the nosepiece to move the phase contrast objective (**Ph 1** or **Ph 2** or **Ph 3**) into the light path.



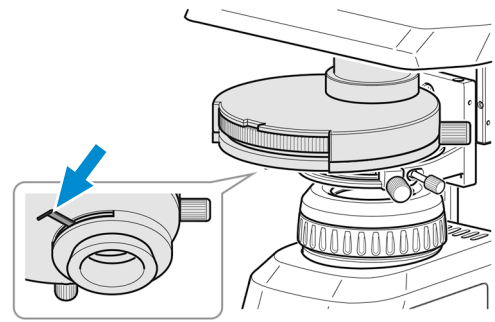
2. Open the luminous-field diaphragm on the stand.



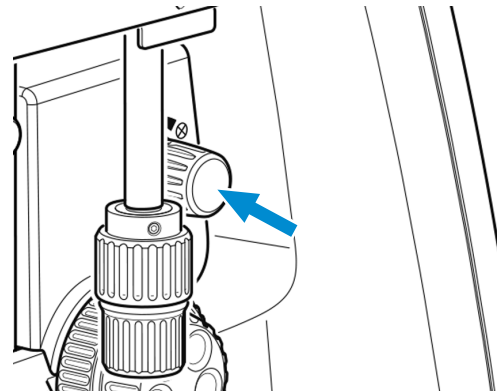
3. Turn the turret disk of the turret condenser to the phase contrast position (**Ph 1** or **Ph 2** or **Ph 3**) that corresponds to the objective being used.



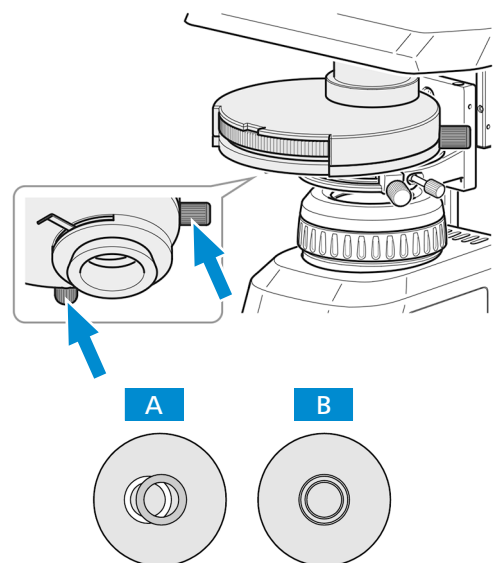
4. Fully open the aperture diaphragm of the turret condenser using its control lever (left limit stop).



5. Adjust the illumination intensity as required.



6. To center the phase stop, remove one eyepiece and replace it with the diopter or telescope.
7. If necessary, center the phase stop from position **A** to position **B** by turning the two knurled screws.



8. Replace the diopter or telescope with the eyepiece.

### Info

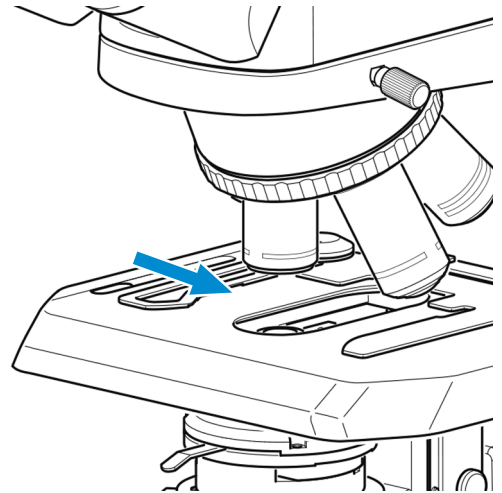
For darkfield application, use the darkfield position of the turret condenser instead of the phase contrast position.

### Info

If the turret condenser is not equipped with a darkfield stop, contact an authorized ZEISS service technician for installation.

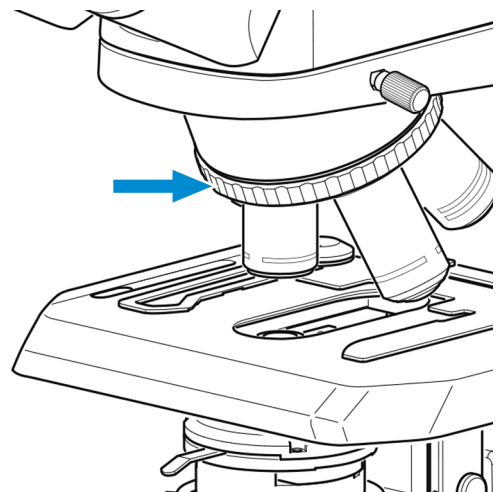
## 5.8 Adjusting the Transmitted-Light Simple Polarization Contrast

- Prerequisite** ✓ The simple polarization contrast on the microscope requires a stand with Full-Köhler equipment.
- ✓ The polarizer plate is inserted into the luminous-field diaphragm in the correct position, see *Installing the Polarizer Plate (Full Köhler Stand)* [▶ 48].
- ✓ The analyzer plate is inserted into the stand in the correct position, see *Installing the Analyzer Plate* [▶ 49].
- Procedure**
1. Adjust the microscope as you would for transmitted-light brightfield, see *Adjusting the Transmitted-Light Brightfield on the Full-Köhler Microscope* [▶ 65].
  2. Place the specimen to be examined under polarized light on the stage and fix it using the spring lever of the specimen holder.



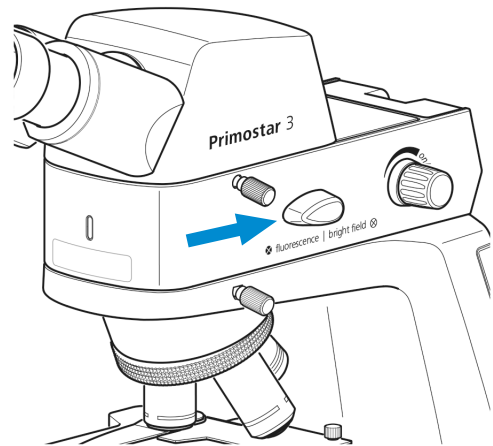
## 5.9 Adjusting the Reflected-Light Fluorescence

- Prerequisite** ✓ The reflected-light fluorescence method requires the microscope with Reflected-Light FL iLED.
- Procedure**
1. Adjust the microscope as you would for transmitted-light brightfield, see *Adjusting the Transmitted-Light Brightfield on the Full-Köhler Microscope* [▶ 65].
  2. Turn the nosepiece to move the objective for fluorescence application into the light path (e.g. objective 40x).

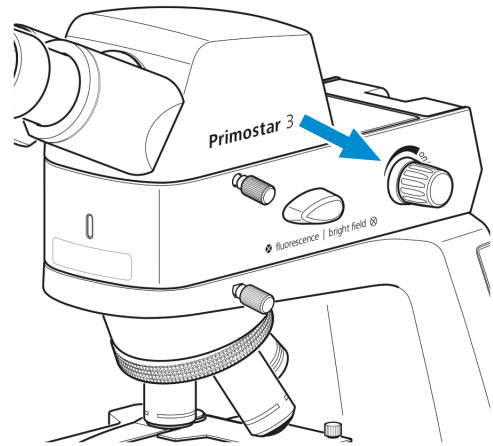




3. Set the **fluorescence/brightfield** changeover switch to the **fluorescence** position (first turn it fully upward).

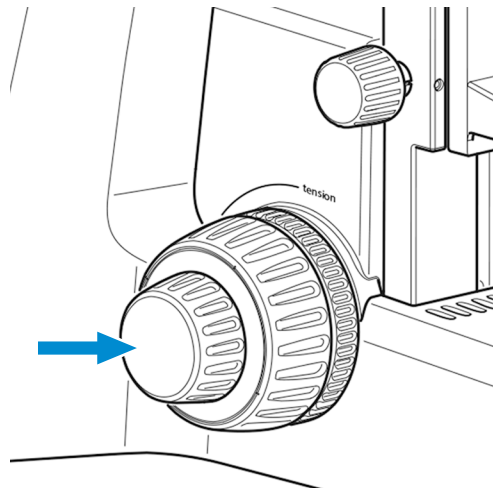


4. Switch on the reflected-light illumination using the rotary knob of the Reflected-light FL iLED and adjust the illumination intensity to a level comfortable for observation.



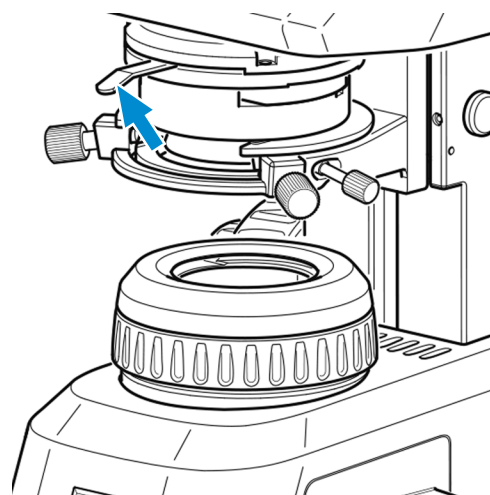
→ The pilot lamp at the front of the Reflected-light FL iLED is blue. The brightness of the pilot lamp corresponds to the illumination intensity adjusted for reflected light.

5. Focus on the specimen using the focusing drive.





6. To avoid interfering fluorescences (caused by the transmitted-light LED), place the yellow filter onto the luminous-field diaphragm (see *Inserting Color Filters (Full Köhler Stand)* [▶ 47]) and close the aperture diaphragm of the condenser completely.



### Info

If the yellow filter is not available, about 90 % of the interfering fluorescence can be eliminated by closing the condenser aperture diaphragm.

It is also possible to insert the TL cover plate into the slot of the Abbe condenser (see *Assembling the Yellow Filter or the TL Cover Plate (Fixed Köhler Stand)* [▶ 47]).

### Info

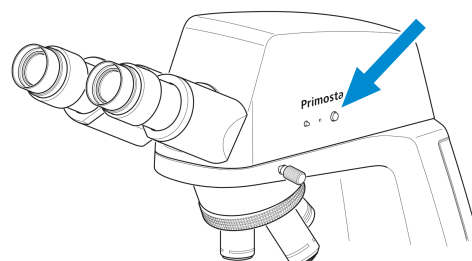
Our special eyecups with light protection can be used for microscopic examinations in rooms which are not darkened. They are, however, not suitable for spectacle wearers and must not be folded over because the required dimensional stability would be lost.

## 5.10 Capturing Images and Videos Using the Integrated Smart 8 MP Color Camera

### 5.10.1 Capturing Images and Videos Using the Operator Panel

**Prerequisite** ✓ The USB flash drive is inserted into the USB A port.

- Procedure**
1. Position your specimen on the microscope and adjust the microscope to see a focused image through the eyepieces.
  2. To take a single image, briefly press the **Snap** button on the camera panel.
    - ➔ The image is saved to the USB flash drive in either JPEG or TIFF format.

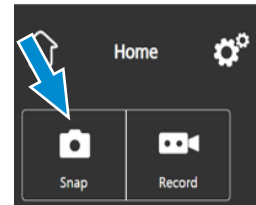


3. To start video recording, press and hold the **Snap** button on the camera panel for about five seconds.
4. To stop video recording briefly press the **Snap** button on the camera again.
  - ➔ The video is saved to the USB flash drive in MP4 format.

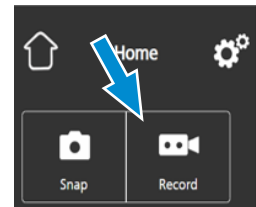
### 5.10.2 Capturing Images and Videos Using the OSD Menu

- Prerequisite**
- ✓ The USB flash drive is inserted into the USB A port.
  - ✓ A mouse and keyboard are plugged into a USB hub, which is connected to the other USB A port.
  - ✓ The Binocular tube 25°/22 w/int cam 8 MPx is connected to a monitor via HDMI.

- 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 **Snap** in the **OSD** menu.
    - The image is saved to the USB flash drive in either JPEG or TIFF format.



3. To start video recording, click on **Record** in the **OSD** menu.
  - The **Record** button changes to **Stop**.



4. To stop video recording click on **Stop** in the **OSD** menu.
  - The video is saved to the USB flash drive in MP4 format.

### 5.10.3 Capturing Images with Labscope

- Prerequisite**
- ✓ Wi-Fi adapter is inserted into the special USB port A; or the binocular tube 25°/22 w/int cam 8 MPx is connected with an Ethernet cable with WLAN. Connection may also be established with a USB 3.0 cable.

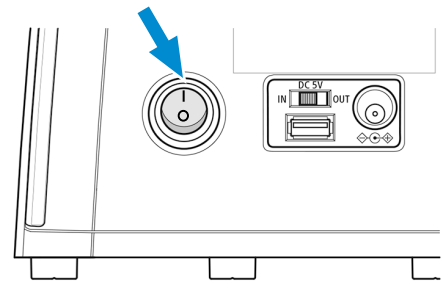
- Procedure**
1. Start **Labscope**.
    - When starting **Labscope** for the first time, each screen starts with an overlaying information screen explaining the functions.
  2. Refer to the displayed information for using the software.
  3. Disable or re-activate the information screens in the software's **Settings** menu on your iPad or PC.

#### Info

For further support in using **Labscope**, see [www.zeiss.com/microscopy/community](http://www.zeiss.com/microscopy/community). Please check the **Labscope** thread for problem-solving notes.

## 5.11 Switching Off the Microscope

- Procedure**
1. After finishing work, switch off the microscope at the **main power ON/OFF** button.



2. If connected, switch off the power bank.
3. 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, service, and cleaning not described must 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.

### DANGER

#### Electric shock due to live parts

When the microscope is still switched on, coming in contact with live parts can lead to electric shock or burn.

- ▶ 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.

Time Interval	Unit/Component	Activity
If required	6 V/30 W halogen lamp of the halogen module	Replace the 6 V/30 W halogen lamp, see <i>Exchanging the Halogen Lamp of the Halogen Module</i> [▶ 82].

Time Interval	Unit/Component	Activity
If required	Firmware update of the Binocular tube 25°/22 w/int cam 8 MPx	<i>Updating the Firmware of the Binocular Tube 25°/22 w/int Cam 8 MPx [► 81].</i>

Tab. 3: 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 Updating the Firmware of the Binocular Tube 25°/22 w/int Cam 8 MPx

- Prerequisite**
- ✓ The Binocular tube 25°/22 w/int cam 8 MPx is connected to a PC or laptop.
  - ✓ USB flash drive is available (not included in the scope of delivery)

- Procedure**
1. Download the latest firmware from the website.
  2. Save the update file to the root folder of the USB flash drive.
  3. Insert the flash drive into the Binocular tube 25°/22 w/int cam 8 MPx's USB port or a connected USB hub.
  4. In the **OSD** menu, click **Settings > Operating System Settings > Firmware Update**.  
→ The firmware is updated automatically.

### 6.3.4 Exchanging the Halogen Lamp of the Halogen Module

#### **⚠ DANGER**

##### **Electric shock due to live parts**

When the microscope is still switched on, coming in contact with live parts can lead to electric shock or burn.

- ▶ Switch off the microscope prior to installing components.
- ▶ Disconnect live parts from the power supply.

#### **⚠ CAUTION**

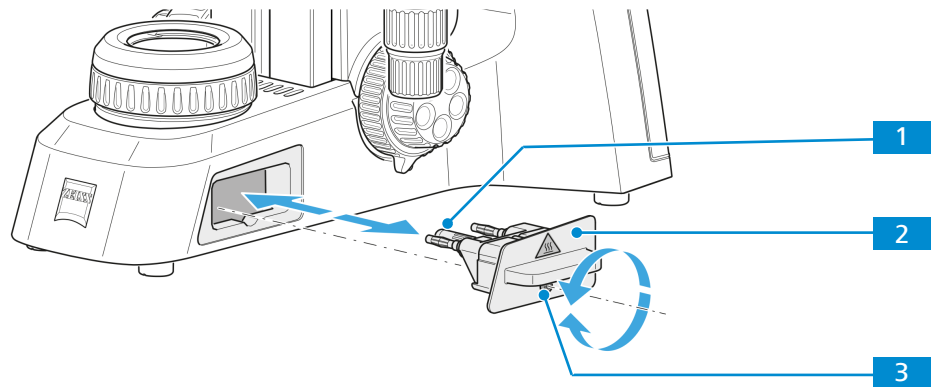
##### **Burning hazard due to hot halogen lamp**

The halogen lamp gets hot during operation.

- ▶ Do not touch the halogen lamp before it has cooled down.

- Parts and Tools**
- 🔧 Hex Key, 3.0 mm
  - 🔧 Halogen lamp 30W 6V

- Procedure**
1. Gently press the fastening screw **3** towards the microscope and turn it clockwise by 90°.



- The halogen module is released.
2. Pull the halogen module **2** out of the stand.
  3. Remove the halogen lamp **1** from the lamp holder and insert the new halogen lamp.  
**NOTICE** Do not touch the new lamp with bare fingers as this will reduce the life-span of the lamp.
  4. Push the halogen module containing the new lamp into the stand.
  5. Gently press the fastening screw towards the microscope and turn it counterclockwise by 90°.  
→ The halogen module is fixed.

## 7 Troubleshooting

The following table provides information about solving common problems.

### Info

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
The field of view is not completely visible.	Nosepiece with objective has not been switched into click-stop position.	Switch nosepiece with objective into click-stop position.
	Condenser has not been set correctly.	Set condenser correctly.
	The aperture diaphragm has not been adjusted correctly.	Adjust aperture diaphragm correctly.
	The luminous-field diaphragm has not been adjusted correctly.	Adjust luminous-field diaphragm correctly.
	The filter has not been inserted correctly into the filter mount.	Insert filter correctly into filter mount.
Low resolving power, poor image contrast	The aperture diaphragm has not been opened to correct size.	Set opening of aperture diaphragm to correct size.
	Condenser not focused correctly.	Focus the condenser.
	Wrong cover glass thickness selected for use of transmitted-light objectives corrected for 0.17 mm cover glass.	Use standard 0.17 mm cover glass.
	Use of no or non-specified immersion oil with immersion objective	Use the supplied immersion oil.
	Air bubbles in immersion oil	Remove the bubbles by applying new oil or moving the objective to and fro.
	Immersion oil on the front lens of a dry objective	Clean the front lens of the dry objective.
	Dirt or dust on the optical surfaces of objectives, eyepieces, condenser, or filters	Clean the respective optical components.
Greater focus differences after changing the objective	The adjustable eyepieces have not been set correctly.	Set the adjustable eyepieces to the corresponding defective vision.

Symptom	Cause	Measure
The 6 V/30 W halogen lamp or the LED source does not light up although the microscope has been switched on.	The power plug has not been plugged into the power outlet.	Connect power plug to power outlet.
	6 V/30 W halogen lamp or LED source is defective.	Replace the defective 6 V/30 W halogen lamp or the LED module.
The 6 V/30 W halogen lamp flickers, its light intensity is unstable, the illumination inhomogeneous	End of average service life of 6 V/30 W halogen lamp has been reached.	Replace the 6 V/30 W halogen lamp.
	Power cable incorrectly installed or broken.	Connect the power cable correctly or replace it.
	The pins of the 6 V/30 W halogen lamp have not been inserted correctly into the lamp holder.	Insert the pins of the 6 V/30 W halogen lamp correctly into the lamp holder.
	The pins of the 6 V/30 W halogen lamp have not been inserted symmetrically into the lamp holder.	Insert the pins of the 6 V/30 W halogen lamp symmetrically into the lamp holder.
Stage comes down by itself, image focus is unstable	Adjusted torque of coarse focusing drive is too low.	Increase the torque of the coarse focusing drive to make motion stiffer.
Transmitted-light illuminator cannot be switched on.	<b>Fluorescence/brightfield</b> changeover switch is in <b>fluorescence</b> position.	<b>Fluorescence/brightfield</b> changeover switch to <b>brightfield</b> position.
Reflected-light FL iLED cannot be switched on.	<b>Fluorescence/brightfield</b> changeover switch is in <b>brightfield</b> position.	<b>Fluorescence/brightfield</b> changeover switch to <b>fluorescence</b> position.
	Reflected-light FL iLED not sufficiently aligned to microscope stand or displaced, causing interruption of power supply by interlock function.	Align the Reflected-light FL iLED exactly to microscope stand and tighten clamping screw sufficiently.
The X direction range is smaller than expected.	Normal behaviour after long hours of use.	Recover the stage travel range: <ul style="list-style-type: none"> <li>■ Hold the specimen holder's two screws.</li> <li>■ Using the control knob, move the specimen holder to the left and right until it hits the end stop.</li> </ul> The stage travel range is reset.



## 7.1 Troubleshooting Binocular Tube 25°/22 w/int Cam 8 MPx

Troubleshooting notes for the use of the built-in camera in conjunction with the network/WLAN and Labscope app can be found separately at the ZEISS website [www.zeiss.com/labscope](http://www.zeiss.com/labscope).

Symptom	Cause	Measure
LED indicator is off.	The camera is not powered on properly.	Check RJ 12 cable connection to stand.
LED indicator flashes red.	The camera is updating firmware or being reset.	Warning! Do not switch off the main power supply on the stand.
Image/Video cannot be saved to the USB flash drive.	USB flash drive is not in correct format.	Please format the USB flash drive to FAT32 format on a PC.
	USB flash drive is full.	Make sure there is enough free space in the flash drive for storage.
	USB flash drive otherwise not recognized.	Restart the camera by powering off the main power supply on the stand.
Firmware update does not function.	The USB flash drive is not recognized or the firmware is not uploaded properly.	Insert a FAT32-formatted USB flash drive with latest firmware in the root folder and make sure the drive has at least 200 MB free memory space. Be sure to follow the instructions in the firmware update menu.
Date/Time is wrong on the camera.	Date/time is not set correctly.	Date/time can be set in OSD under Operating System setting.
	The buffer battery is empty.	Please contact service to change the battery.
The image is very noisy.	The amplification (gain) is set too high.	Open denoise; reduce the gain.
	The exposure time is set too high.	Open denoise; reduce the exposure time.
	The light intensity is set too low.	Open denoise; increase the light intensity.
The image is too dark or too bright.	Light source intensity too high or too low; or auto exposure time too short	Adjust light source intensity, or change to manual exposure.
The camera forgets the settings (e.g. manual white balance, HDMI resolution) if the power supply is disrupted.	Settings are not stored.	It takes 5 seconds for the settings to be automatically stored.

Symptom	Cause	Measure
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. Press factory reset button on the camera, see <i>Binocular Tube 25°/22 w/int Cam 8 MPx</i> [▶ 28].
When switching to 4K, the monitor becomes black and then reverts to 1080p.	The monitor may not support 4K.	Use a 4K monitor such as mode 410350-2405-000 listed on ZEISS micro-shop website.
The image appears distorted on full screen monitor	The image aspect ratio is 16:9. The monitor may be set to a different aspect ratio and causes the distortion.	Set the monitor aspect ratio to 16:9.
The image is blurred on the screen but the sample is in focus through eye-pieces	Focus plane of the camera is different from that of the eye-pieces	Make sure the sample is focused correctly through eye-pieces and calibrate the camera adaptor until image is in focus on the monitor.
No list of network names is shown when trying to connect the camera to a router via Wi-Fi USB adapter.	When the Wi-Fi setting is switching between modes, it takes ~10 s for the new mode to load.	Wait for 10 s and click again to refresh the drop-down list.
Buttons do not react when pressed.	The buttons are temporarily locked, as the camera is being accessed exclusively from the PC or network.	Control the camera via PC software or ZEISS app, or close the PC software or ZEISS app.
The camera shows unexpected behavior.	The camera settings may have been changed unintentionally.	Press factory reset button on the camera, see <i>Binocular Tube 25°/22 w/int Cam 8 MPx</i> [▶ 28].

## 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 such as several months, they should be shut down completely and secured against unauthorized access.



#### **DANGER**

##### **Electric shock due to live parts**

When the microscope is still switched on, coming in contact with live parts can lead to electric shock or burn.

- ▶ 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:

- The boxes must be secured during transport.
  - Avoid rocking the 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.
- Maximum shock resistance**
- Do not drop or bump the boxes during movement or storage. Any acceleration shall be < 10 g.
  - Evaluate packaging shock and tilting sensors on delivery and after internal transport.
- Allowable temperature**
- Allowable temperature during on-site storage and transport 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 dark room where artificial illumination, sunlight or other light sources cannot interfere with image acquisition. The microscope should not be installed near windows with direct sunlight or radiators. 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 provided at the time of installation. Due to continuous development, we reserve the right to change specifications without notice.

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: Stand with ...	Length (mm)	Width (mm)	Height (mm)	Weight (kg)
Binocular tube	417	208	395	8.2
Phototube	417	208	395	8.3-9.2*
Binocular tube 25°/22 w/int cam 8 MPx	417	208	395	9.4-10.1*
Tube/phototube turned 180°	306	208	395	
Reflected-light FL iLED	444	208	471	9.6-11.4*

\* Depending on the configuration

#### Location requirements

Installation site	Exclusively inside buildings
Altitude	Max. 2000 m above sea level
Atmospheric pressure	Min. 800 hPa

#### 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	800 to 1060 hPa
Pollution degree	2

<b>Mains connection</b>	Nominal AC voltage	L / N 100 to 240 VAC $\pm$ 10 %
	Nominal frequency	50 / 60 Hz
	Main Power Plug	Local mains plug will be supplied.
	Power consumption	max. 100 VA
	Protection class	IP20 (IEC 60529)
	IEC earth class	Class II of IEC 61140
	Overvoltage Category	II

## 9.2 Performance Data and Specifications of the Optional Components

The customer is responsible for ensuring that the installation conditions for the microscope are met and that the required equipment is already available at the time of installation. Changes are reserved due to continuous technical developments.

<b>Halogen lamp</b>	Voltage	6 V
	Power consumption	30 W
	Adjustability of light source, continuous	from 1.5 to 6 VDC
	Color temperature at 6 V	2800 K
	Luminous flux	280 lm
	Average service life	1000 h
	Luminous area	1.5 x 3 mm

<b>LED illumination</b>	LED	white light
	Constant, brightness-independent color temperature	5600 K
	Homogeneous field illumination	20 mm (diameter)
	Suitable for objectives with magnifications of	4x to 100x
	Analogous brightness adjustment from	approx. 15 to 100 %

<b>LED in LED modules</b>	Power consumption	max. 3.5 W
	Wavelength	455 / 470 nm

<b>Stand with stage focusing</b>	Coarse focusing drive	42 mm / rev.
	Fine focusing drive	0.2 mm / rev.
	Total stage lift	20 mm

<b>Nosepiece</b>	Objective change	manual via quadruple objective nosepiece	
	Objectives	infinity-corrected objective range	
	Mounting thread	W 0.8	
<b>Eyepieces</b>	Tube size	30 mm	
	Field-of-view number	20 or 22	
	Magnification	10x	
	Suitable for spectacle wearers	Br.	
	Focusable	Foc.	
<b>Specimen stage</b>	Type	Rackless	
	Dimensions (width x depth)	140 x 135 mm	
	Stage travel (X x Y)	75 x 40 or 75 x 50	
	Coaxial drive	optional right or left	
	Vernier scales	readable from the right	
	Specimen holder	with spring lever, left	
<b>Condenser</b>	Abbe condenser 0.9/1.25; Fixed-Köhler	for V <sub>obj</sub> 4x to 100x	
	Abbe condenser 0.9/1.25; Full-Köhler	for V <sub>obj</sub> 4x to 100x	
	Turret condenser 0.9/1.25; Full-Köhler	for V <sub>obj</sub> 4x to 100x	
<b>Illuminating mirror</b>	Plane surface and spherical surface with f'	75 mm	
<b>Binocular Phototube</b>		<b>Small binocular phototube 25°/20</b>	<b>Big binocular phototube 25°/22</b>
	Maximum field-of-view number	20	22
	Interpupillary distance	adjustable from 48 to 75 mm	adjustable from 48 to 75 mm
	Tube angle	25°	25°
	Viewing height	380 to 415 mm	380 to 415 mm
	Viewing port, tube factor	1x	1x
	Photo/video port, tube factor	1x	1x
	Photo/video port, mount	60 mm	60 mm
	Invariable splitting ratio	50 vis/50 doc %	50 vis/50 doc %

### 9.3 Performance Data and Specifications of the Binocular Tube 25°/22 w/int Cam 8 MPx

The customer is responsible for ensuring that the installation conditions for the microscope are met and that the required equipment is already available at the time of installation. Changes are reserved due to continuous technical developments.

Binocular tube 25°/22	Power consumption	12 VDC 1.0 A
	Maximum field-of-view number (eyepiece)	22
	Acquired visual field of the camera	14.2 x 8.0 mm 16.3 mm (diagonal)
	Eyepiece (interpupillary) distance	adjustable from 48 to 75 mm
	Viewing angle	25°
	Eyepoint height	from 385 to 420 mm
	Fixed graduation	50 / 50
	Optical adaptation	0.5x
Integrated HD- CMOS camera	Sensor type	Sony CMOS color sensor with back illumination
	Number of pixels	3840 (H) x 2160 (V) = 8.3 megapixels
	Pixel size	1.85 x 1.85 µm
	Sensor size	image diagonal 8.15 mm equivalent to 1/1.9"
	Live image frame rate via HDMI (3840 x 2160)	30 fps (maximal values when using optimal hardware)
	Digitization	8 Bit/pixel
	Exposure time range	61 µs to 1 s
	Interface	USB 3.0 Type B, RJ45 (LAN), HDMI, 3 x USB 3.0 Type A, RJ12 for power supply
	Optical interface	integrated adapter
	Power interface	RJ12
	Cooling	passive cooling by aluminum cooling fins on the top plate

#### Info

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



## 9.4 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 2015/863/EU	RoHS Directive
2017/746 EU	European Regulation on in-vitro diagnostic medical devices (IVDR)
EN 55011	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
EN 61010-1 and IEC 61010-2-101	safety requirements for electrical equipment for measurement, control, and laboratory use
EN 61326-1 EN 61326-2-6	electrical equipment for measurement, control and laboratory use – EMC requirements / IVD requirements

According to EU-regulation 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.

## 10 Accessories and 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
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 <a href="https://www.micro-shop.zeiss.com/de/de/shop/objectives">https://www.micro-shop.zeiss.com/de/de/shop/objectives</a> or ask your ZEISS Sales &amp; Service Partner.</p>
Sliders	<p>The following sliders are available:</p> <ul style="list-style-type: none"> <li>Slider H/Ph2 f/Primostar 3</li> <li>Slider H/Ph1/Ph2/Ph3</li> <li>Slider DF f/Primostar 3</li> <li>Polarizer f/Primostar 3</li> <li>Analyzer f/Primostar 3</li> </ul>
Color filters	<p>The following color filters are available:</p> <ul style="list-style-type: none"> <li>Set of color filters blu/grn/yel d45x1.5</li> </ul>
Eyepieces	<p>The following eyepieces and accessories are available:</p> <ul style="list-style-type: none"> <li>Eyepiece 10x/20 Br. foc.</li> <li>Eyepiece 10x/22 Br. foc.</li> <li>Pair of special eyecups</li> <li>Pinhole diaphragm D= 30 mm</li> </ul>
Condensers	<p>The following condensers are available:</p> <ul style="list-style-type: none"> <li>Abbe condenser 0.9/1.25</li> <li>Turret condenser with BF/Ph1/Ph2/Ph3/DF</li> </ul>
Sample holders	<p>The following sample holders are available:</p> <ul style="list-style-type: none"> <li>Specimen holder lh</li> <li>Specimen holder work f/two slides lh</li> </ul>

Name	Description/Info
Light sources	<p>The following light sources are available:</p> <ul style="list-style-type: none"> <li>Transmitted-light illumination 3W 5600K</li> <li>Transmitted-light illumination 6V/30W</li> <li>Reflected-light FL iLED 455 nm</li> <li>Reflected-light FL iLED IDC 455 nm</li> <li>Reflected-light FL iLED 470 nm</li> </ul>
Tubes	<p>The following tubes are available:</p> <ul style="list-style-type: none"> <li>Binocular tube 25°/20</li> <li>Binocular phototube 25°/20 (50.50)</li> <li>Binocular phototube 25°/22 (50.50)</li> </ul>
Cameras	<p>The following cameras and accessories are available:</p> <ul style="list-style-type: none"> <li>Axiocam 208 color</li> <li>WiFi USB adapter for Labscope connection</li> <li>Binocular tube HD 25°/22 w/int cam 8 MPx demo kit</li> <li>Camera adapter P95-C 2/3" 0.65x</li> <li>Camera adapter P95-C 1/2" 0.5x</li> </ul>
Transport and storage cases	<p>The following transport and storage cases are available:</p> <ul style="list-style-type: none"> <li>Case for transport and storage of Primo Star</li> <li>Transport+storage case f/Primostar 3</li> </ul>

## Revision History

Revision	Date of Issue	Introduced Modifications
3	03/2022	Implementation of revision history Adaptation to Regulation (EU) 2017/746 (IVDR)

# Glossary

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**HDMI**

High Definition Multimedia Interface

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**LED**

Light-emitting diode

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**OSD**

On Screen Display

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**TL (transmitted light)**

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

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**Transmitted-light brightfield**

Transmitted-light brightfield microscopy is the most common of all optical microscopic techniques, as it permits high-contrast or stained specimens (e.g. blood smears) to be viewed easily and quickly. Beside the so-called direct bundles of rays, the indirect bundles (i.e. those diffracted and scattered by specimen details) are also of major importance for providing true imaging of the object. The higher the proportion of indirect bundles of rays (aperture), the more realistic the microscopic image according to ABBE. To fully exploit the optical performance of the microscope, particularly that of the objective, the condenser, luminous-field diaphragm and aperture diaphragm should be set based on the rules of the KÖHLER illumination principle.

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**USB**

Universal Serial Bus, an industry standard that defines cables, connectors and communications protocols for connection, communication, and power supply between computers and devices.

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**User**

Person examining a sample under the microscope.

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**Wi-Fi**

Wireless Fidelity

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**ZEISS**

ZEISS is an internationally leading technology enterprise operating in the fields of optics and optoelectronics. Further information about ZEISS can be found at [www.zeiss.com](http://www.zeiss.com).

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**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.

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**ZEISS service representative**

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

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