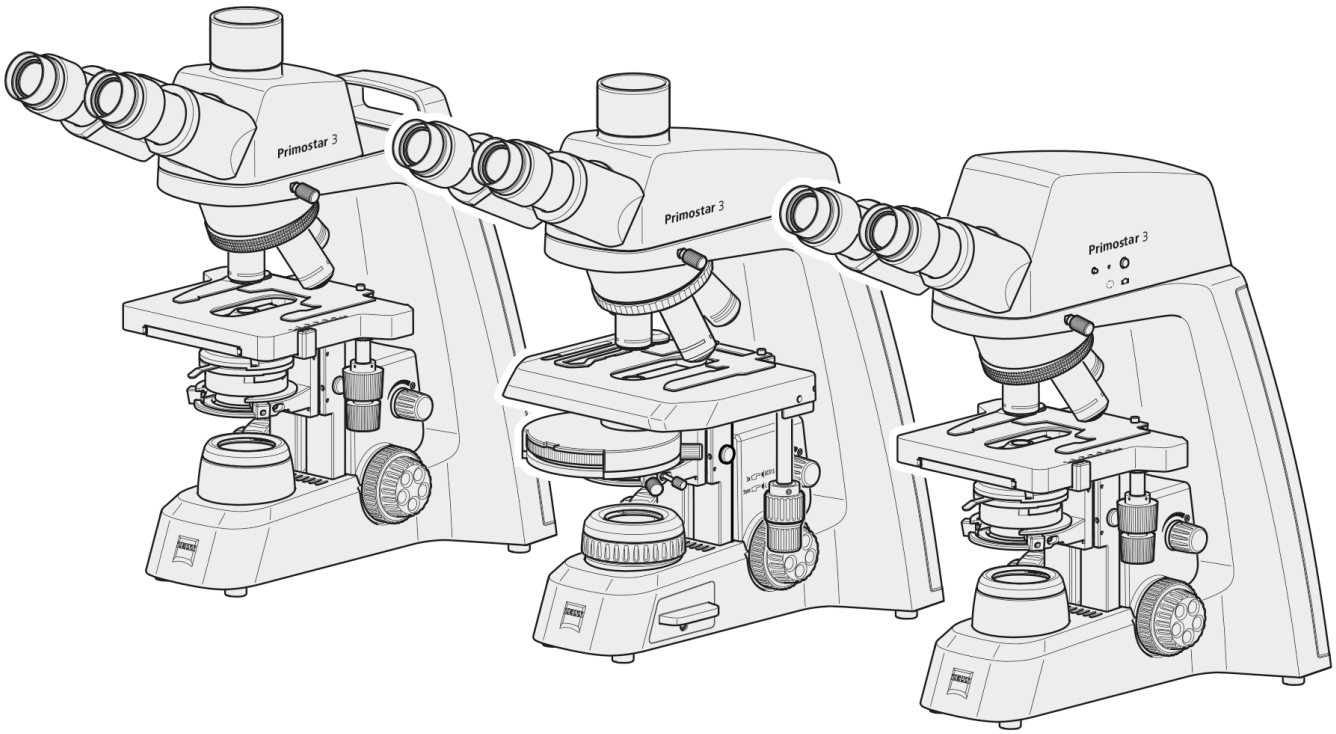


Instruction Manual

ZEISS Primostar 3

Upright Microscope for Education and Routine

ZEISS Primostar 3

Original Manual

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

Carl Zeiss Suzhou Co., Ltd.
Modern Industrial Square 3-B, No.333 XingPu Road SIP
215126 Suzhou
China

Document Name: ZEISS Primostar 3 Instruction Manual
Order Number: 415501-7011-111_en
Revision: 1
Language: en-US
Effective from: 10/2020

© 2020 Without the prior written consent of ZEISS, this document or any part of it must neither be translated nor reproduced or transmitted in any form or by any means - including electronic or mechanic methods, by photocopying, recording or by any information or filing system. The right to make backup-copies for archiving purposes shall remain unaffected thereby. Any violations may be prosecuted as copyright infringements.

The use of general descriptive names, registered names, trademarks, etc. in this document does not imply that such names are exempt from the relevant intellectual property laws and regulations and therefore free for general use. This shall also apply if this is not specifically referred to. Software programs shall entirely remain the property of ZEISS. No program or subsequent upgrade thereof may be disclosed to any third party, copied or reproduced in any other form without the prior written consent of ZEISS, even if these copies or reproductions are destined for internal use at the customer's only, the only exception being one single back-up copy for archiving purposes.

ZEISS reserves the right to make modifications to this document without notice.

Table of Contents

1 General Information 6

1.1 Text Conventions and Link Types 6
1.2 Explanation on Warnings and Additional Information 6
1.3 Further Applicable Documents 7
1.4 Contact 8

2 Safety 9

2.1 Intended Use 9
2.2 General Safety Information 9
2.2.1 Safe Operating Conditions 9
2.2.2 Requirements for Users 10
2.3 Prevention of Hazards 10
2.4 Warning and Information Labels 11
2.5 Safety Devices and Interlocks 13
2.5.1 Safety Device of the Reflected-light Fluorescence Illuminator 14

3 Product and Functional Description 15

3.1 Main Components of the Imaging System 16
3.1.1 Primostar 3 (Fixed-Köhler) 16
3.1.2 Primostar 3 iLED (Fixed-Köhler) 17
3.1.3 Primostar 3 (Fixed-Köhler) with Primostar 3 HD IP Camera 18
3.1.4 Primostar 3 (Full-Köhler) 19
3.2 Controls and Connections 20
3.2.1 Fixed-Köhler Stand 20
3.2.2 Full-Köhler Stand 23
3.2.3 Reflected-Light Fluorescence Illuminator iLED 26
3.2.4 Primostar 3 HD IP Camera 27
3.2.5 Battery Supply Unit 29
3.2.6 Condenser 30
3.2.7 Eyepiece 31
3.2.8 Cable and Screw Tool Storage 31
3.3 Accessories for Connecting the Microscope 32
3.4 Objective Labeling 33
3.5 On Screen Display (OSD) menu of the Primostar 3 HD IP Camera 35
3.5.1 Home Menu 35
3.5.2 Settings Menu 37

4 Installation 42

4.1 Safety during Installation 42
4.2 Prepare Installation 42
4.3 Installing Additional Components 43
4.3.1 Installing or Changing the Tube 43
4.3.2 Installing the Reflected-light Fluorescence Illuminator iLED onto the Stand 44
4.3.3 Attaching or Removing Yellow Filter or TL Cover Plate (Fixed Köhler Stand) 47
4.3.4 Inserting Color Filters (Full Köhler Stand) 48
4.3.5 Installing the Polarizer Plate (Full Köhler Stand) 49

4.3.6 Installing the Analyzer Plate 49
4.3.7 Installing the Primostar 3 HD IP Camera 50
4.3.8 Installing a Camera to the Trinocular Tube 52
4.3.9 Replacing Objectives 53
4.3.10 Installing/Removing the Condenser 54
4.3.11 Installing/Removing the Mirror 55
4.3.12 Inserting an Eyepiece Pointer or an Eyepiece Micrometer 55
4.3.13 Folding Over the Eyecups 57
4.3.14 Changing the Eyecups 57
4.4 Connecting the Microscope to the Power Supply 58
4.4.1 Connecting the Microscope to the Mains Power Supply 58
4.4.2 Connecting the Microscope to the Battery Supply Unit 58
4.4.3 Connecting the Microscope to a Power Bank 59
4.5 Connecting the Primostar 3 HD IP Camera to a Storage Medium or Imaging Device 60
4.5.1 Connecting a USB Flash Drive 60
4.5.2 Connecting to the PC via USB 3.0 Port 60
4.5.3 Connecting to a Display (without PC) 61
4.5.4 Integrating the Primostar 3 HD IP Camera into a Network 61
4.6 Installing Software for Use of the Primostar 3 HD IP Camera 64
4.6.1 Installing the Labscope Software on PC 64
4.6.2 Installing the ZEISS ZEN lite Software on PC 64
4.6.3 Installing the Labscope App on iPad 64

5 First Operating Steps 65

5.1 Prerequisites for Commissioning and Operation 65
5.2 Switching on the Microscope 65
5.2.1 Microscope is directly connected to the Mains Power Supply 65
5.2.2 Microscope is connected to the External DC Power Supply (12 V) 66
5.2.3 Microscope is connected to a Power Bank 67
5.3 Adjusting the Tube 67
5.3.1 Setting the Interpupillary Distance 67
5.3.2 Setting the Viewing Height 68
5.3.3 Setting the Eyepiece with Eyepiece Pointer or Eyepiece Micrometer 68
5.4 Adjusting the Transmitted-Light Brightfield on the Full-Köhler Microscope 69
5.5 Adjusting the Transmitted-Light Brightfield on the Fixed-Köhler Microscope 73
5.6 Adjusting the Transmitted-Light Phase Contrast or the Transmitted-Light Darkfield using a Contrast Slider 74
5.7 Adjusting the Transmitted-Light Phase Contrast or the Transmitted-Light Darkfield using the Turret Condenser 78
5.8 Adjusting the Transmitted-Light Simple Polarization Contrast 80
5.9 Adjusting the Reflected-Light Fluorescence 80
5.10 Capturing Images and Videos Using the Integrated Smart 8 MP Color Camera 82
5.10.1 Basic Procedure Using Operator Panel 82
5.10.2 Basic Procedure Using OSD menu 83
5.10.3 Image Capture with Labscope or ZEN Lite 83
5.11 Switching off the Microscope 84

6 Care and Maintenance 85

6.1 Safety during Maintenance 85
6.2 Maintenance Schedule 85

6.3 Maintenance Work ... 86
6.3.1 Replacing the 6 V/30 W Halogen Lamp of the Halogen Module ... 86
6.3.2 Replacing the Batteries of the Battery Supply Unit ... 87
6.3.3 Charging the Batteries of the Battery Supply Unit ... 88
6.3.4 Firmware Update of the Primostar 3 HD IP Camera ... 89
6.4 Care and Cleaning Work ... 89
6.4.1 Cleaning the Primostar 3 ... 89
6.4.2 Cleaning the Primostar 3 HD IP Camera ... 90

7 Troubleshooting ... 91

7.1 Troubleshooting Primostar 3 HD IP Camera ... 93
7.1.1 Troubleshooting with ZEN Lite Software ... 95

8 Transport and Storage ... 96

8.1 Important Data for Transport and Storage ... 96

9 Technical Data and Conformity ... 97

9.1 Applicable Standards and Regulations ... 97
9.2 Performance Data and Specifications ... 97
9.3 Performance Data and Specifications of the Optional Components ... 99
9.4 Performance Data and Specifications of the Primostar 3 HD IP camera ... 101

10 Accessories and Optional Components ... 103

10.1 Accessories ... 103
10.2 Optional Components ... 104

Glossary ... 109

Index ... 110

1 General Information

This Instruction Manual pertains to the Primostar 3, hereinafter referred to as the "microscope". This Instruction Manual contains basic steps and safety information that must be observed during operation and maintenance. For this reason, these operating instructions must be read by the specialist staff / operator prior to commissioning and must always be available at the place of use of the microscope. This Instruction Manual belongs to the microscope and must remain with the microscope or be handed over to the purchaser when sold.

1.1 Text Conventions and Link Types

The following text conventions and link types are used:

Text convention	Meaning
Click **Start**. Press the **STANDBY** button. Press **[Enter]** on the keyboard.	The names of controls and important information are shown in bold letters.
Press **<Ctrl+Alt+Del>**	Press several keys on the keyboard simultaneously.
Select **Tools > Goto Control Panel > Airlock**.	Follow a path in the software.
Text input	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 convention

Link type	Meaning
See: *Text Conventions and Link Types [▸ 6]*.	Link to further information for this topic.
https://www.zeiss.com/corporate/int/home.html	Link to a website on the internet.

Tab. 2: Link types

1.2 Explanation on Warnings 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 instructions and warnings in the **Safety** chapter are to be considered but also the safety instructions and warnings 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 symbols and warnings 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 users better understand the contents of this Instruction Manual.

1.3 Further Applicable Documents

Please take also note of the following documents:

Installation Requirements For more details on technical data, refer to the corresponding Installation Requirements.

System and 3rd Party Components, Accessories The Microscope can be configured in many ways. Information about the individual components, enhancements and accessories can be obtained from your ZEISS Sales & Service Partner. Also refer to the 3rd Party documentation of the manufacturer.

Software For more detailed information on how to use ZEN, please refer to its Online Help.

Safety data sheets Observe the enclosed safety data sheets. The instructions and guidelines given in the respective safety data sheets must be complied with.

Downloads Brochures, Safety data sheets, ISO certificates, CSA certificates and EU declarations of conformity as well as software and firmware updates can be found at https://www.zeiss.com/microscopy/int/downloads.html or ask your ZEISS Sales & Service Partner.

1.4 Contact

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

Headquarter

Phone:	+49 1803 33 63 34
Fax:	+49 3641 64 3439
Email:	info.microscopy.de@zeiss.com

Service Germany

Phone:	+49 7364 20 3800
Fax:	+49 7364 20 3226
Email:	service.microscopy.de@zeiss.com

Courses and training

Email:	courses.microscopy.de@zeiss.com

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.

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 on basic safety instructions and requirements is a precondition for safe and fault-free operation. Operational safety of the supplied Microscope is only ensured if it is operated according to its intended use.

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

2.1 Intended Use

The Primostar 3 microscope is an all-purpose, light-optical device used primarily for examining cell and tissue cultures. Typical applications are examinations of blood and tissue samples taken from the human body or of plant and animal origin.

The microscope, including its original accessories, must not be used for microscopic techniques other than those described in this Instruction Manual. The manufacturer does not assume any liability for other applications, including those of individual modules or components.

2.2 General Safety Information

This Instruction Manual must be read before commissioning to ensure safe and permanent operation. Pay particular attention to all listed safety notes. Please ensure that

- the operating personnel have read, understood and complied with this Instruction Manual, related documents and especially all safety regulations and instructions.
- the local and national safety and accident prevention regulations are observed.
- this Instruction Manual is always kept to hand near the microscope.
- the microscope is in perfect condition.
- no reflective objects are held in the beam path.
- the microscope is secured against unauthorized access when not in use.
- maintenance and repair work, remodeling, removal or replacement of components, as well as any other intervention in the device not described in this document, may only be carried out by the manufacturer ZEISS or persons expressly authorized by ZEISS to do so.

Please observe the generally applicable local and national safety and accident prevention regulations, as well as the applicable laws and regulations in your country.

2.2.1 Safe Operating Conditions

If it is noted that protection measures are no longer effective or other circumstances occur which impair safety and cause changes in operating behavior, the microscope should be shut down immediately and a ZEISS service technician should be notified. Make sure that all the protective panels and warning labels are attached and readable.

2.2.2 Requirements for Users

The microscope, its system components and accessories may only be operated and maintained by authorized and trained personnel. The user must be aware of the possible dangers involved with microscopy and the particular application concerned.

Training As part of the initial commissioning, authorized ZEISS personnel provide basic training on operating the system, which also includes information on device safety and maintenance steps that can be carried out by the user himself, and a safety briefing. The training provided must be documented accordingly. Special application training is offered for a fee. For training courses on using the microscope, visit https://www.zeiss.com/microscopy/int/service-support/training-and-education.html.

2.3 Prevention of Hazards

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

Explosion hazards Do not operate the microscope and its accessories in potentially explosive areas, in the presence of volatile anesthetics or in the presence of combustible solvents, such as alcohol, benzene or similar chemicals.

Optical Radiation Hazard 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 wavelength, exposure time and mode of operation (continuous or pulsed).

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

Heavy weight The toppling and falling of the microscope may cause injuries to the user. Only operate the device on a stable work table with a solid and smooth tabletop.

Risk of burns The microscope emits heat during operation and up to ten minutes after it is switched off. Before any transportation, switch off the device and let it cool down. Only operate the device on a stable work table with a solid, non-combustible tabletop.

Damage by dirt or humidity Dirt, dust and humidity may impair the performance of the microscope or damage the microscope or its components. Protect the device against such influences to the greatest possible extent. When not using the microscope, switch it off, let it cool down and cover it with the respective dust cover.

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

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

Shut down the Microscope and disconnect the power supply before cleaning.

If an external DC power is connected, it shall be a limited power source.

Don't connect the mains socket and the 12 V DC port as the power input at the same time.

Hazardous specimen The microscope is not equipped with special user protection against substances that are corrosive, potentially infectious, toxic, radioactive or otherwise hazardous to health. When handling such substances, make sure to observe all legal regulations, particularly the relevant national accident prevention regulations.

Immersion oil Immersion oil irritates the skin and the eyes. When using immersion oil, always read the relevant safety data sheet first. Avoid any contact of the oil with skin, eyes and clothing. After skin contact, wash the oil off with plenty of water and soap. After eye contact, immediately rinse the eye with plenty of water for at least five minutes. If the irritation persists, consult a medical specialist. Ensure that no immersion oil enters the surface water or the sewage system.

False diagnosis The visualized images of the camera 8MPx may only be used for training and research. Direct generation of diagnostic results from these images is not recommended.

Inappropriate transport Inappropriate transportation may damage the microscope or cause further material damage. Before any transportation, switch off the device and let it cool down. Only use the original packaging for storage or transportation. Maintain the transportation and storage temperatures as specified in Technical Data and Conformity.

Sensitive optics The microscope contains sensitive optical components. Do not touch optical surfaces. Avoid fingerprints on the surfaces of lenses and light sources.

Unauthorized manipulation Using components not certified by the microscope manufacturer and any unauthorized opening of the device or its components lead to the loss of all warranty claims. Only use microscope components supplied by ZEISS. Do not open the device unless you are trained and explicitly authorized by ZEISS. Always contact ZEISS or a certified service agency for the repair of the instrument.

Inappropriate disposal The microscope is not to be disposed of with household waste. Dispose of the device, illumination bulbs, batteries, the power supply and other components in compliance with the provisions of the law in force.

2.4 Warning and Information Labels

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

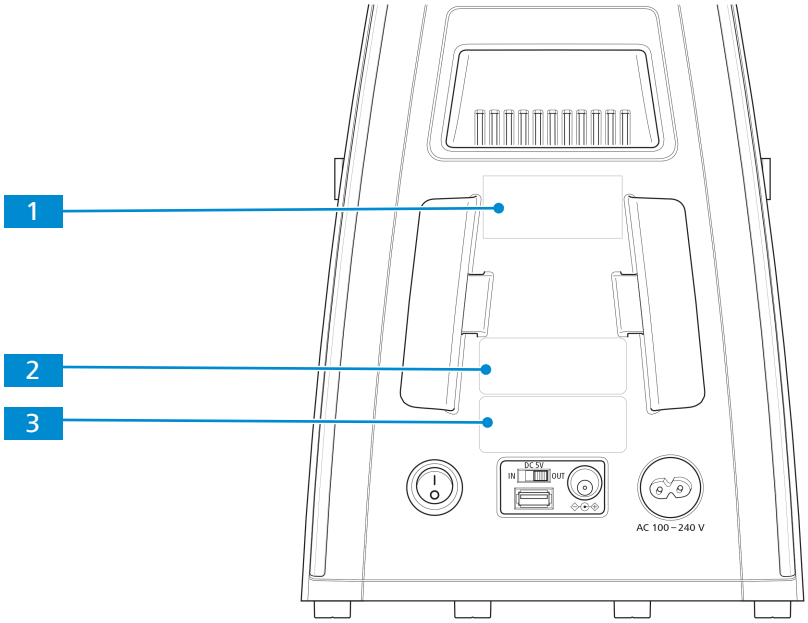


Fig. 1: Positions of labels on the microscope rear side

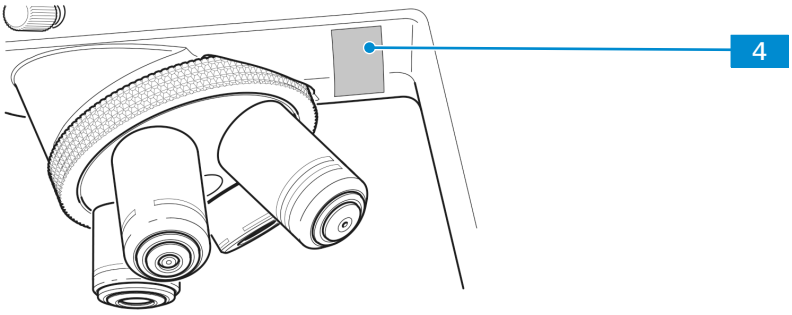


Fig. 2: Position of the label

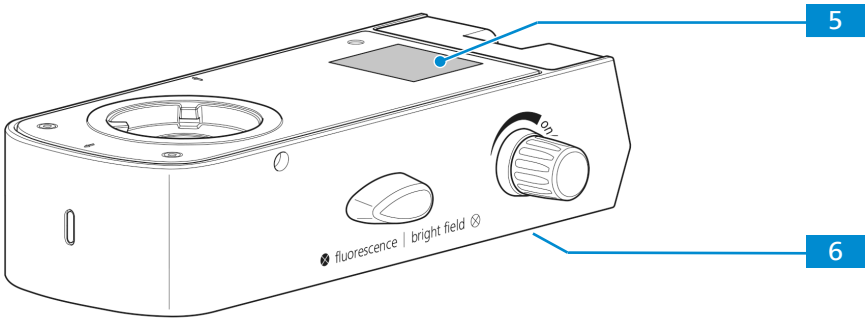


Fig. 3: Positions of labels on the fluorescence unit

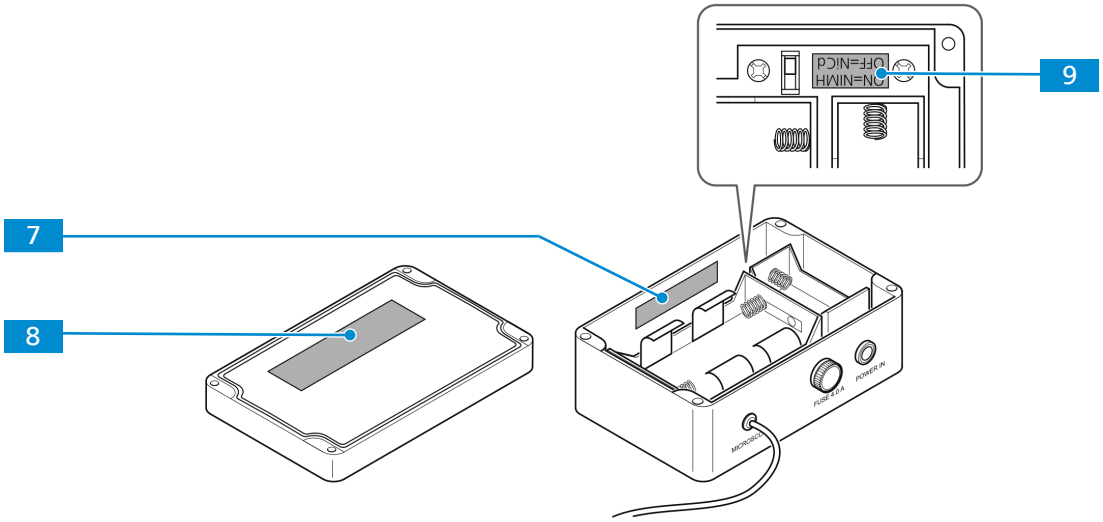
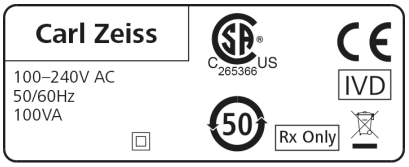
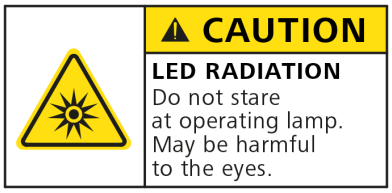
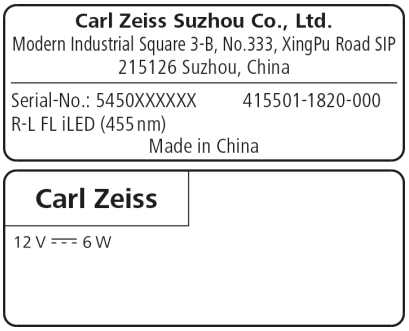
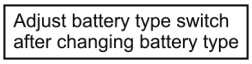
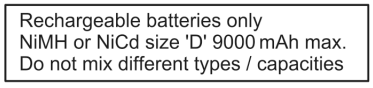
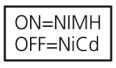


Fig. 4: Positions of labels on the battery supply unit

The meaning of each warning and information label is explained below.

Position	Symbol	Description
1	⚠ CAUTION **Hot surface below** Operate microscope only on a stable, solid, smooth and not tinderlike surface.	Hot surface below Operate microscope only on a stable, solid, smooth and not tinderlike (non-flammable) surface.
2	**Carl Zeiss Suzhou Co., Ltd.** Modern Industrial Square 3-B, No.333, XingPu Road SIP 215126 Suzhou, China Serial-No.: 3176XXXXXX 415501-0001-000 Primostar 3 12V⎓2A Made in China 5V⎓1A **Carl Zeiss Suzhou Co., Ltd.** Modern Industrial Square 3-B, No.333, XingPu Road SIP 215126 Suzhou, China Serial-No.: 3176XXXXXX 415501-0021-000 Primostar 3 Made in China	Microscope type label

Position	Symbol	Description
3		Microscope type label
4		Primostar 3 EU Importer Carl Zeiss Microscopy GmbH Carl-Zeiss-Promenade 10 07745 Jena, Germany
5		CAUTION LED RADIATION Do not stare at operating lamp. May be harmful to the eyes.
6		Fluorescence unit type label
7		Adjust battery type switch after changing battery type
8		Recharcheable batteries only NiMH or NiCd size 'D' 9000mAh max. Do not mix different types / capacities
9		Positions of battery type switch ON=NIMH OFF=NiCd

Tab. 3: List of attached warning and information labels

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. Defects and other damaged safety devices may cause injuries and property damage. In case of damage or defect, the affected parts of the Microscope must be taken out of operation immediately and be secured against unintentional use.

For verifying the safety of the Microscope, please contact your ZEISS service representative. Please keep the service logs and logbooks.

2.5.1 Safety Device of the Reflected-light Fluorescence Illuminator

To prevent personal injury and/or property damage, the reflected-light fluorescence illuminator is equipped with an interlock function, which causes the built-in LED of the reflected-light illuminator to be switched off as soon as the reflected-light illuminator 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, please contact your ZEISS sales and service partner and keep the service protocols for your microscope.

3 Product and Functional Description

The Primostar 3 are transmitted-light microscopes of compact design with a small footprint.

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

3.1 Main Components of the Imaging System

3.1.1 Primostar 3 (Fixed-Köhler)

The Fixed-Köhler microscope has the following main components:

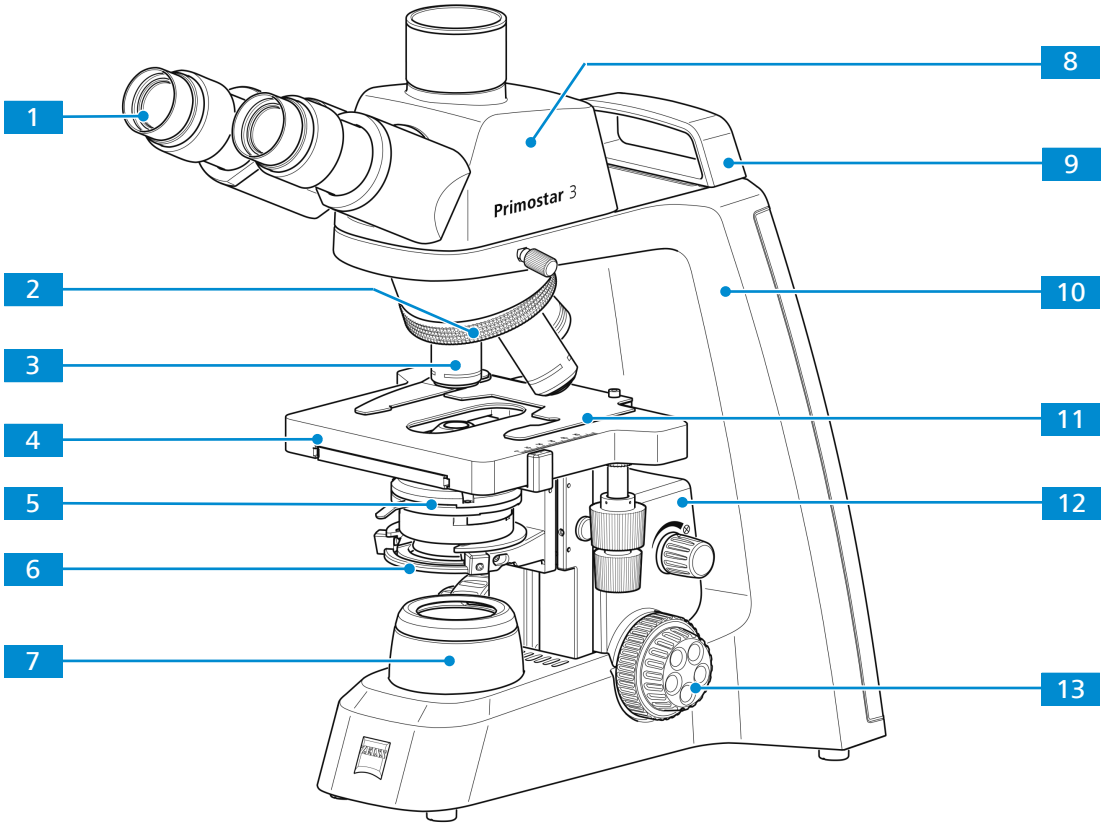


Fig. 5: Main components of the Fixed-Köhler microscope

1	Eyepiece WF 10x/20 Br. Foc.	2	Nosepiece with four positions
3	Objective	4	Rackless stage 75x40, drive right or drive left
5	Abbe condenser 0.9/1.25 field 20, Fixed-Köhler	6	Condenser carrier, Fixed-Köhler
7	Luminous-field diaphragm, Fixed-Köhler	8	Trinocular tube 25°/20 (50:50)
9	Small hand lift	10	Stand
11	Specimen holder left for rackless stage	12	Stage carrier
13	Focusing drive		

3.1.2 Primostar 3 iLED (Fixed-Köhler)

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

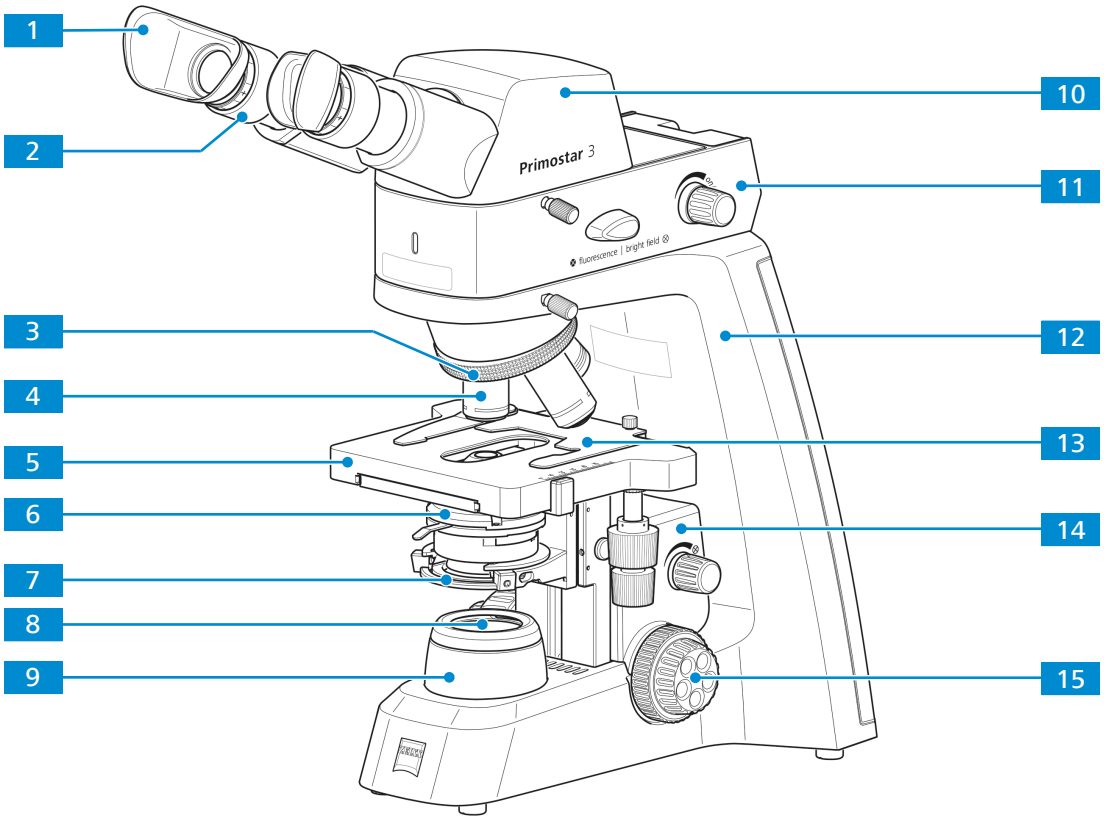


Fig. 6: Main components of the Fixed-Köhler microscope with iLED

1	Special eyecups with light protection mounted	**2**	Eyepiece WF 10x/20 Br. Foc.
3	Nosepiece with four positions	**4**	Objective
5	Rackless stage 75x40, drive right or drive left	**6**	Abbe condenser 0.9/1.25 field 20, Fixed-Köhler
7	Condenser carrier, Fixed-Köhler	**8**	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)
9	Luminous-field diaphragm, Fixed-Köhler	**10**	Binocular tube 25°/20
11	Reflected-light fluorescence illuminator iLED	**12**	Stand
13	Specimen holder left for rackless stage	**14**	Stage carrier
15	Focusing drive		

3.1.3 Primostar 3 (Fixed-Köhler) with Primostar 3 HD IP Camera

The Fixed-Köhler microscope with Primostar 3 HD IP camera has the following main components:

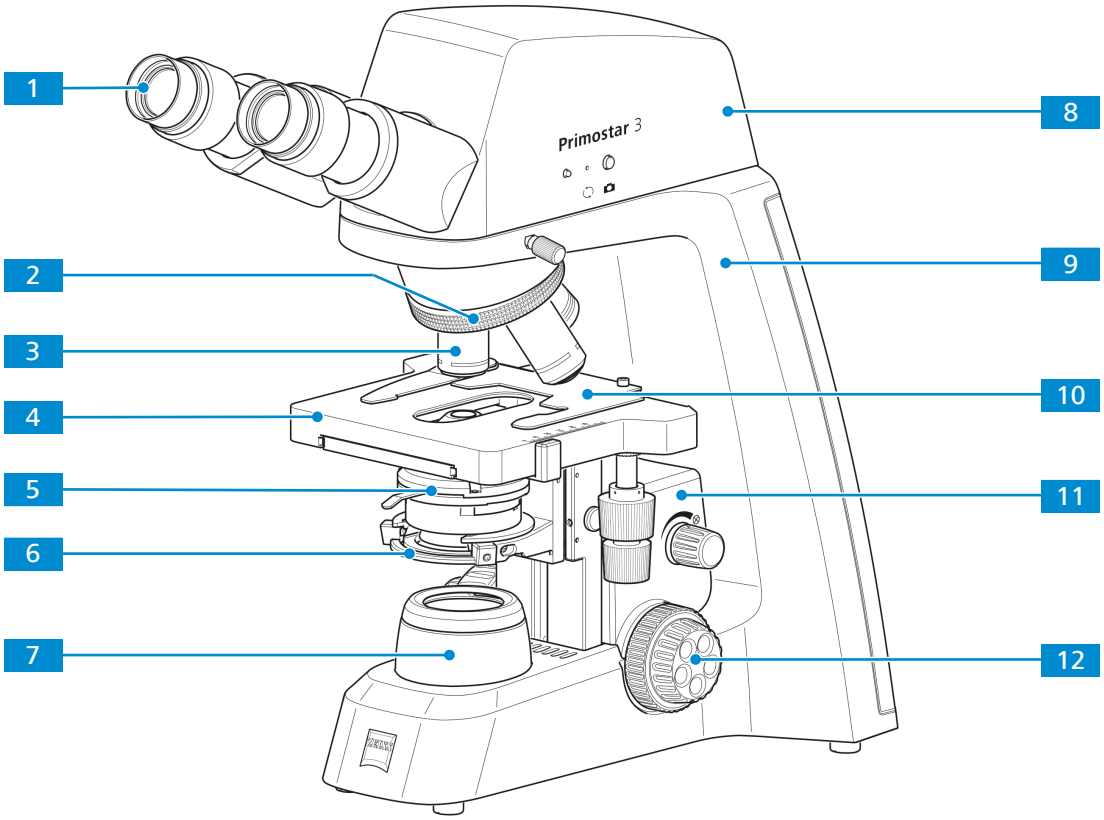


Fig. 7: Main components of Fixed-Köhler microscope with Primostar 3 HD IP camera

1	Eyepiece WF 10x/20 Br. Foc.	2	Nosepiece with four positions
3	Objective	4	Rackless stage 75x40, drive right or drive left
5	Abbe condenser 0.9/1.25 field 20, Fixed-Köhler	6	Condenser carrier, Fixed-Köhler
7	Luminous-field diaphragm, Fixed-Köhler	8	Primostar 3 HD IP camera
9	Stand	10	Specimen holder left for rackless stage
11	Stage carrier	12	Focusing drive

3.1.4 Primostar 3 (Full-Köhler)

The Full-Köhler microscope has the following main components:

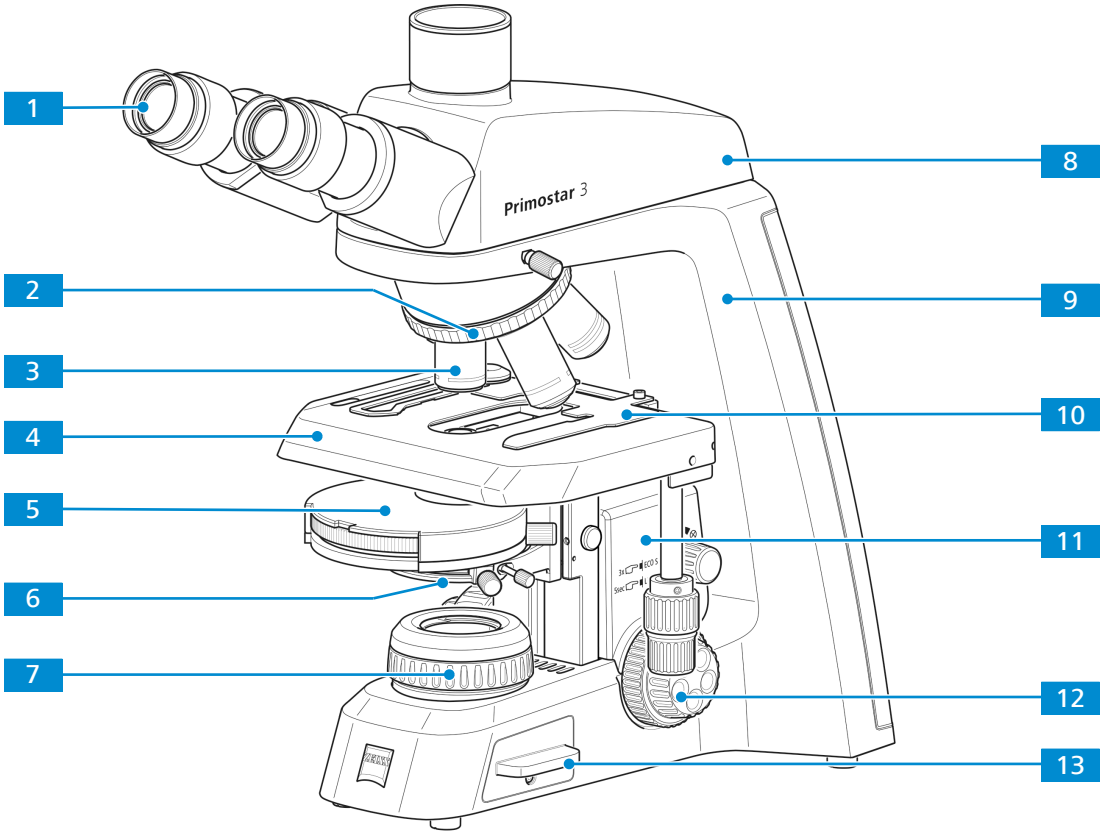


Fig. 8: Main components of the Full-Köhler microscope

1	Eyepiece WF 10x/22 Br. Foc.	2	Nosepiece with five positions
3	Objective	4	Rackless stage 75x50, drive right or drive left
5	Turret condenser 0.9/1.25 field 22, Full-Köhler or Abbe condenser 0.9/1.25 field 22, Full-Köhler	6	Condenser carrier with centering screws for condenser adjustment, Full-Köhler
7	Luminous-field diaphragm, Full-Köhler	8	Trinocular tube 25°/22 (50:50)
9	Stand	10	Specimen holder for 2 sliders
11	Stage carrier	12	Focusing drive
13	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.

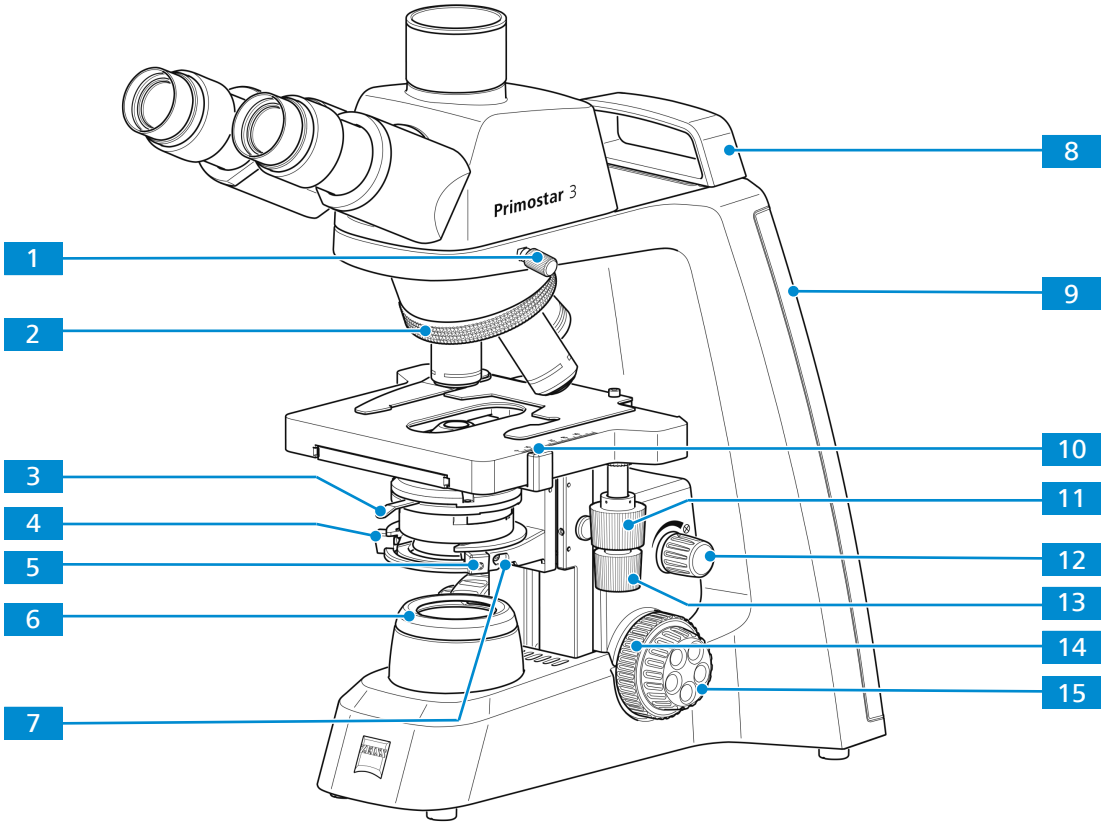


Fig. 9: Stand controls on the right side

1 Clamping screw for tube

2 Knurled ring for turning the nosepiece

3 Lever for adjusting the aperture diaphragm of the condenser, see also *Condenser [▸ 30]*

4 Centering screw (Allen screw) for condenser on condenser carrier (left side)

5 Centering screw (Allen screw) for condenser on condenser carrier (right side)

6 Cover cap of the luminous-field diaphragm

7 Clamping screw for condenser

8 Small hand lift (only Fixed-Köhler stand)

9 Illumination-intensity indicators for transmitted light (right side)
The selected intensity is indicated in five layers by the Cyan light-emitting diodes belt.

10 Vernier and scale, displaying the Y position of the stage

11 Control knob for Y travel of rackless stage

12 Rotary knob to adjust the illumination intensity for transmitted light

13 Control knob for X travel of rackless stage

14 Coarse focusing drive (right side)

15 Fine focusing drive (right side)

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

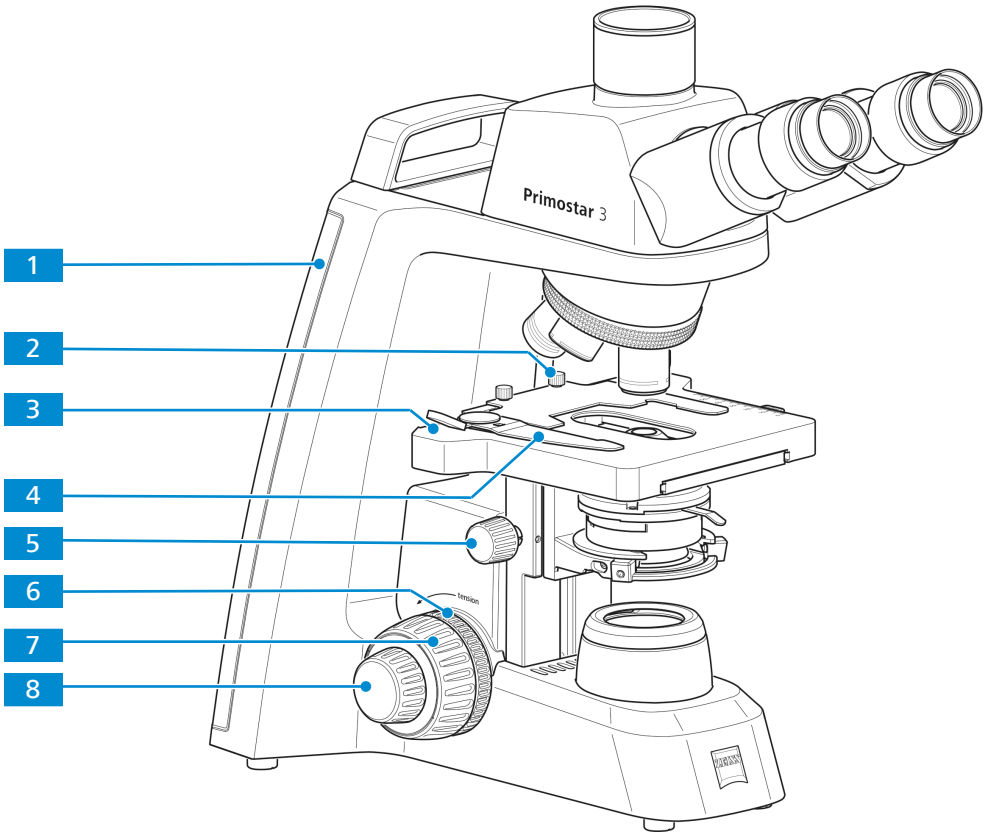


Fig. 10: Stand controls on the left side

1 Illumination-intensity indicators for transmitted light (left side)
The selected intensity is indicated in five layers by the Cyan light-emitting diodes belt.

2 Clamping screw for the specimen holder

3 Vernier and scale, displaying the X position of the stage

4 Lever of the specimen holder for fixing the specimen

5 Knurled ring for condenser height adjustment

6 Knurled ring for adjusting the smoothness of the coarse focusing drive

7 Coarse focusing drive (left side)

8 Fine focusing drive (left side)

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

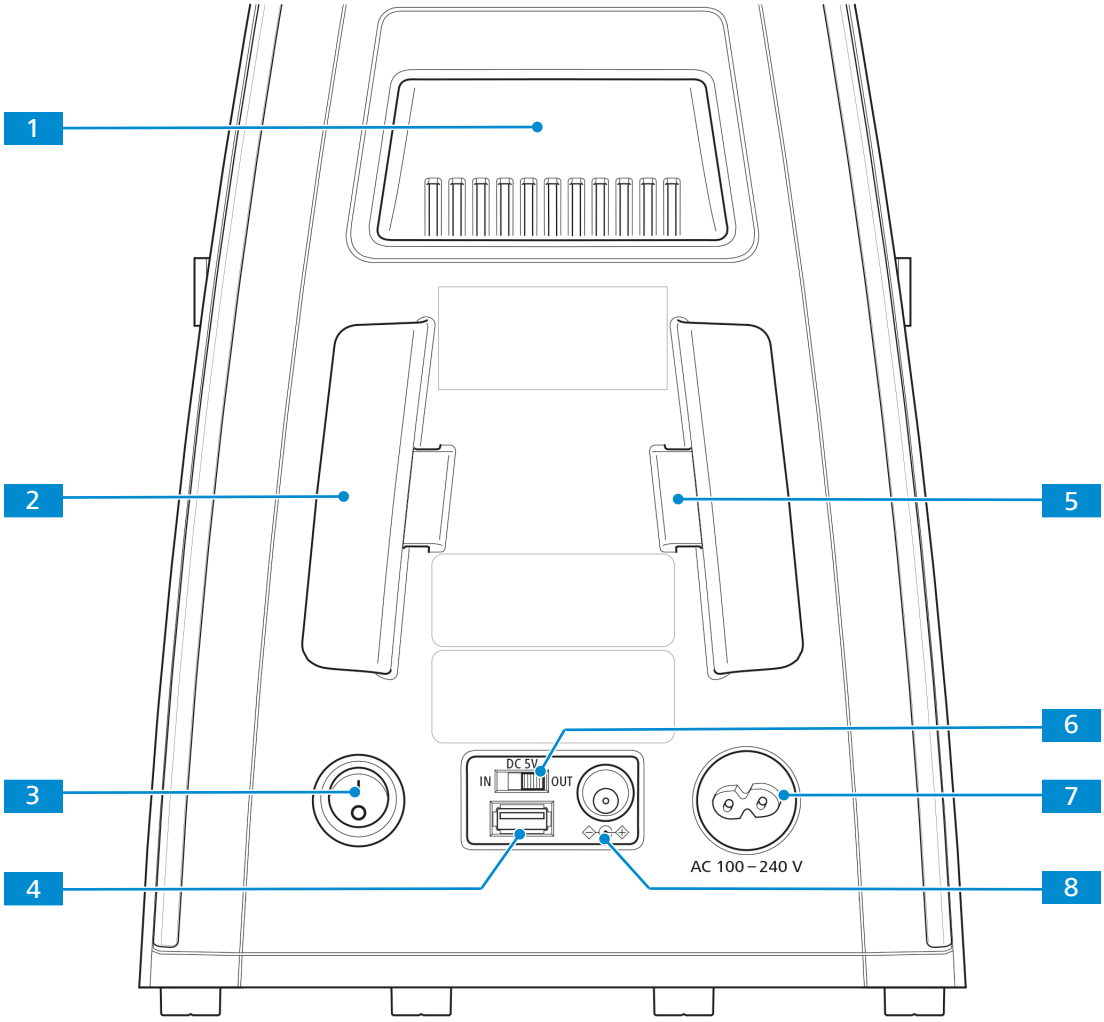


Fig. 11: Stand controls and connections on the rear side

1	Carrying handle	2	Holder for power cable
3	**Main power ON/OFF** button	4	5V USB port for mobile power bank
5	Storage place for phase plate adjustment tool	6	**DC 5V** switch
7	Mains socket	8	Connection port for external DC power supply (12 V) (e.g. for the battery supply unit)

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.

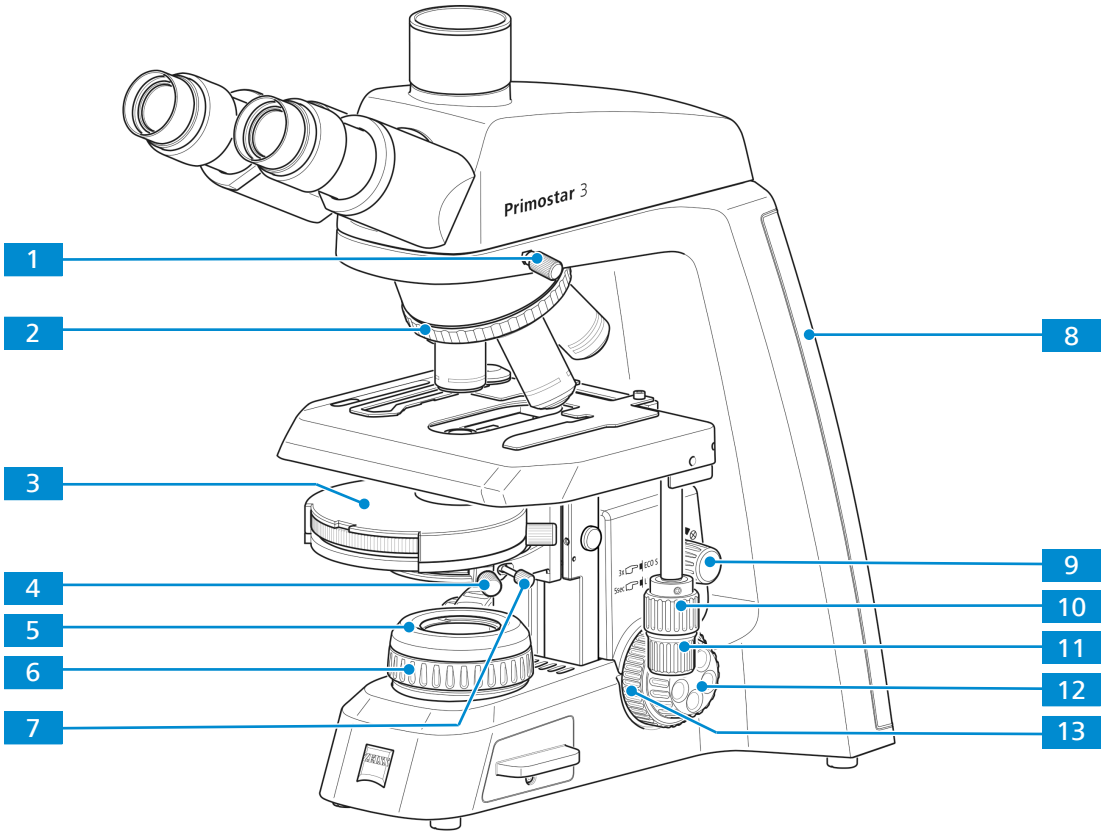


Fig. 12: Stand controls on the right side

1 Clamping screw for tube

2 Knurled ring for turning the nosepiece

3 Turret condenser, controls see *Condenser [▸ 30]*

4 Centering screw (knurled screw) for condenser on condenser carrier (right side)

5 Cover cap of the luminous-field diaphragm

6 Knurled ring for adjusting the luminous-field diaphragm

7 Clamping screw for condenser

8 Illumination-intensity indicators for transmitted light (right side)
The selected intensity is indicated in five layers by the Cyan light-emitting diodes belt.

9 Rotary knob for varying the brightness of the microscopic image, for switching on / off the Light manager and the ECO mode

10 Control knob for Y travel of rackless stage

11 Control knob for X travel of rackless stage

12 Fine focusing drive (right side)

13 Coarse focusing drive (right side)

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

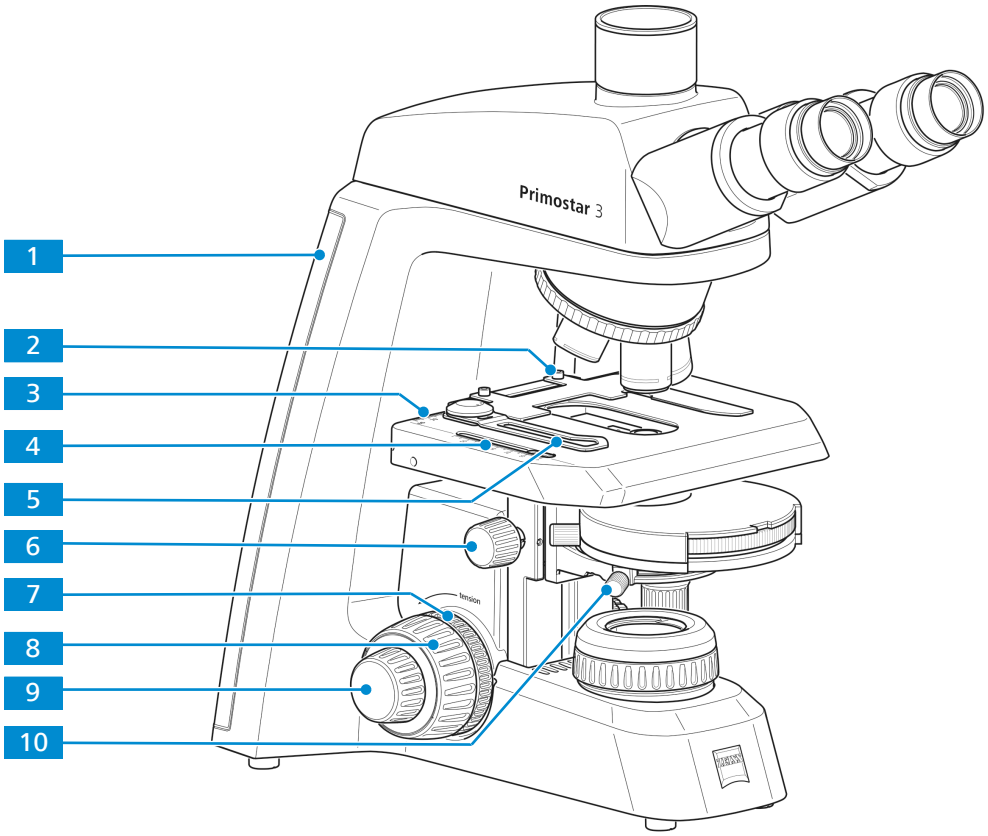


Fig. 13: Stand controls on the left side

1 Illumination-intensity indicators for transmitted light (left side)
The selected intensity is indicated in five layers by the Cyan light-emitting diodes belt.

2 Clamping screw for the specimen holder

3 Vernier and scale, displaying the X position of the stage

Knurled ring for condenser height adjustment

4 Vernier and scale, displaying the Y position of the stage

5 Lever of the specimen holder for fixing the specimen

6 Knurled ring for condenser height adjustment

7 Knurled ring for adjusting the smoothness of the coarse focusing drive

8 Coarse focusing drive (left side)

9 Fine focusing drive (left side)

10 Centering screw (knurled screw) for condenser on condenser carrier (left side)

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

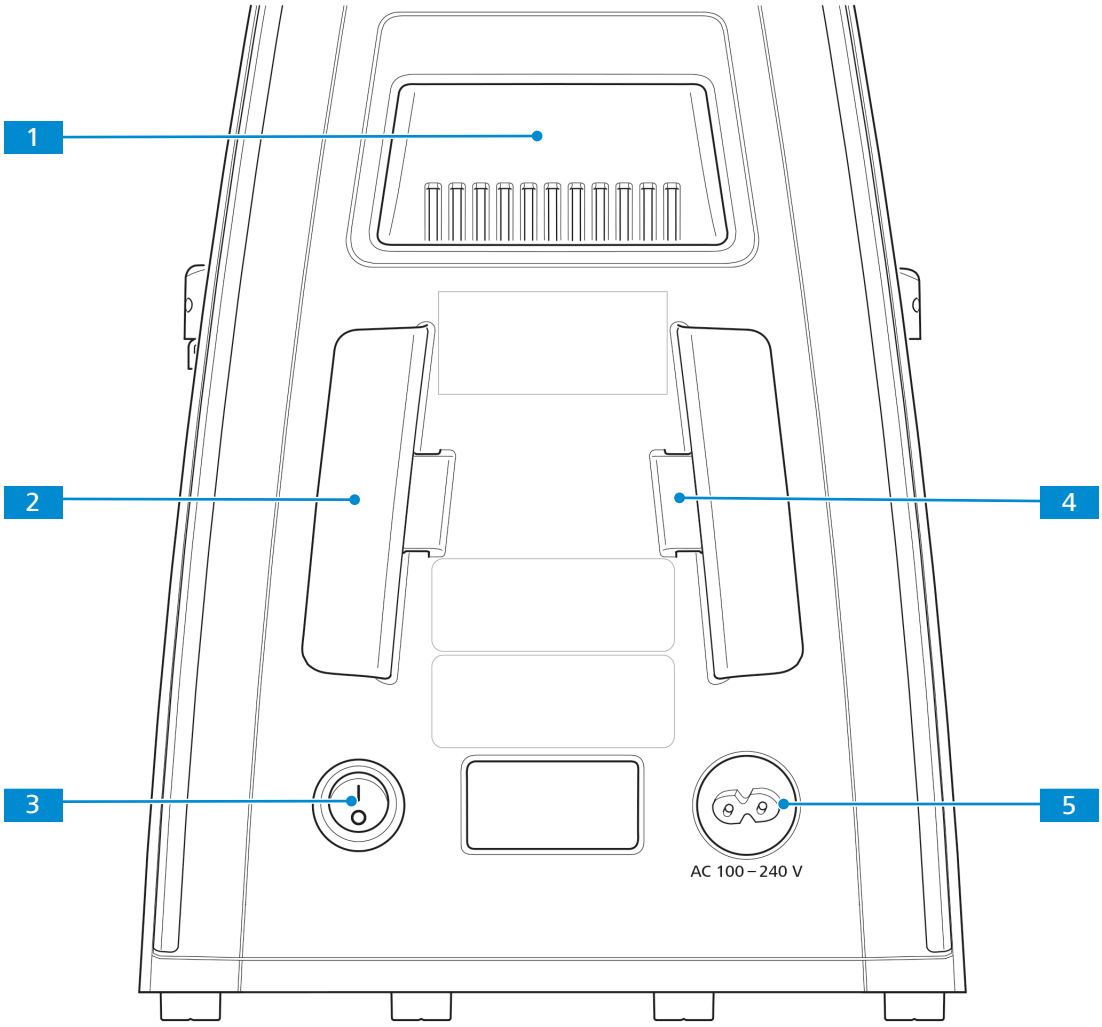


Fig. 14: Stand controls and connections on the rear side

1	Carrying handle	2	Holder for power cable
3	**Main power ON/OFF** button	4	Storage place for phase plate adjustment tool
5	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 Fluorescence Illuminator iLED

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

Position The reflected-light fluorescence illuminator is mounted on the Fixed-Köhler stand (without small handle lift).

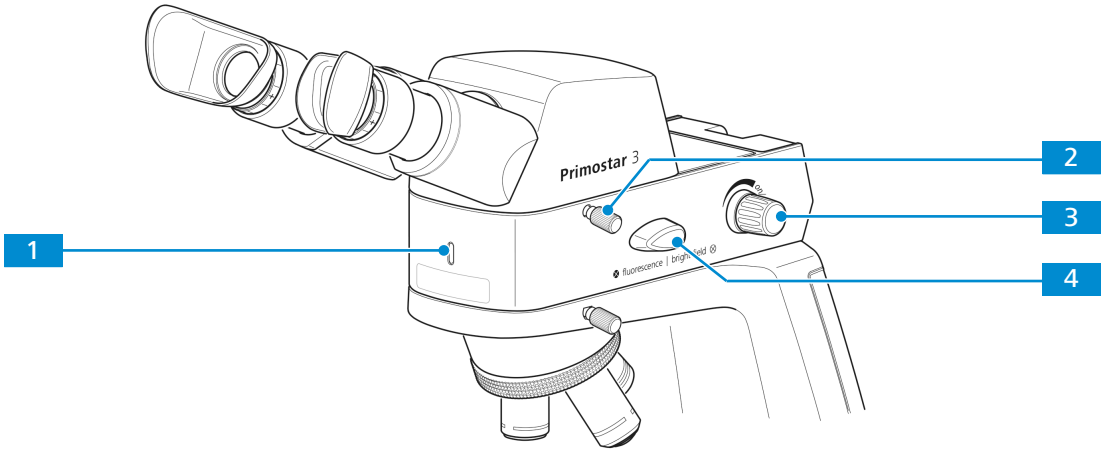


Fig. 15: Controls of the reflected-light fluorescence illuminator

1 Pilot lamp for reflected-light fluorescence illuminator:
lights up blue when switched on;
brightness corresponds to intensity

2 Clamping screw for tube

3 Rotary knob for switching ON/OFF and adjusting the intensity for reflected light

4 Transmitted light/reflected light changeover switch (Brightfield/fluorescence)
Always turn the transmitted light/reflected light changeover switch first upward and then to the desired position. Using force to turn it downward will damage the reflected-light illuminator.

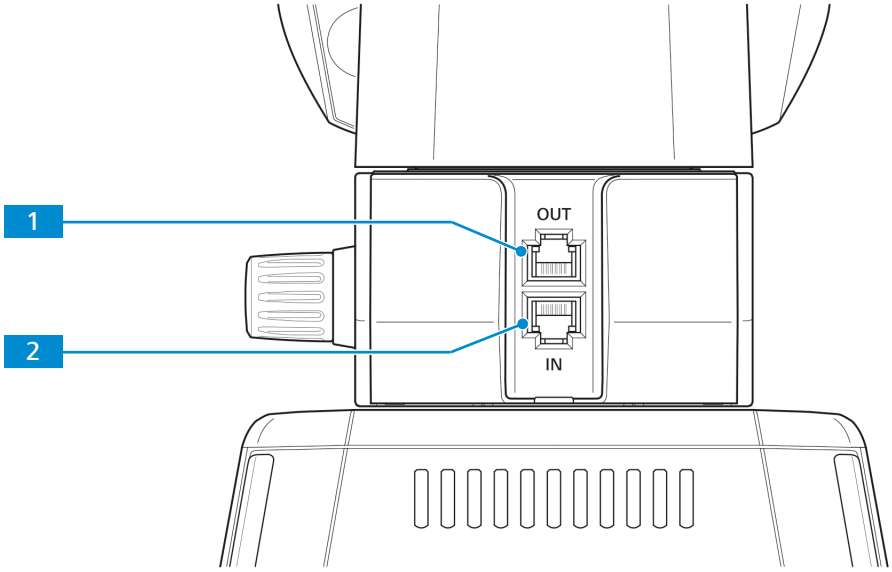


Fig. 16: Connections and special components on the rear side of the reflected-light fluorescence illuminator

1 RJ12 port
For power supply of the Primostar 3 HD IP camera, if mounted additionally

2 RJ12 port
For power supply of the reflected-light fluorescence illuminator

3.2.4 Primostar 3 HD IP Camera

Purpose The Primostar 3 HD IP camera 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 Primostar 3 HD IP camera can only be mounted on the stand without small handle lift.

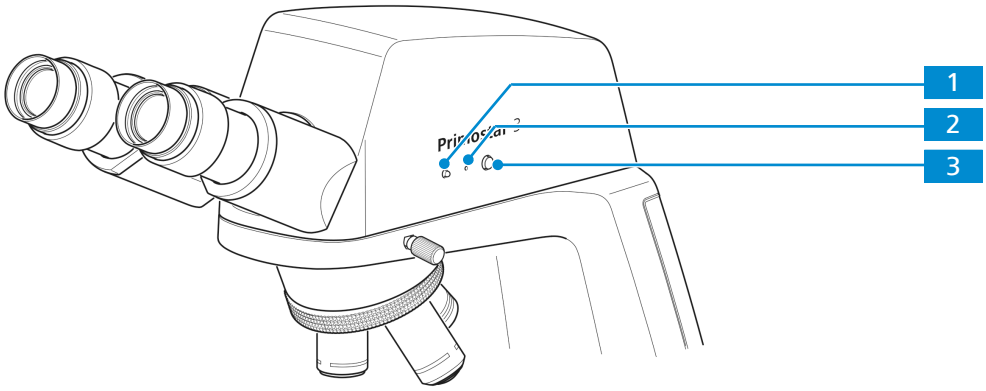


Fig. 17: Controls of the Primostar 3 HD IP camera

1 LED indicator:
Shows the current camera working status.

2 **Reset** button:
Restarts the camera by continuously pressing the button for 5 seconds using a clip.

3 **Snap** button:
Press briefly to trigger an exposure, press and hold to start a video recording, press briefly to stop a video recording

The states of the Primostar 3 HD IP camera are displayed by LED indicator.

System status/operating mode	LED indicator display
Start sequence	LED lights up pink
Snapping/recording in process, and saving data to USB flash drive	LED flashes blue
Power supplied and camera ready	LED lights up blue
Firmware updating/factory resetting	LED flashes red
No USB flash drive or the drive is full	LED flashes pink

Tab. 4: System status/operating mode of the Primostar 3 HD IP camera shown by LED indicator

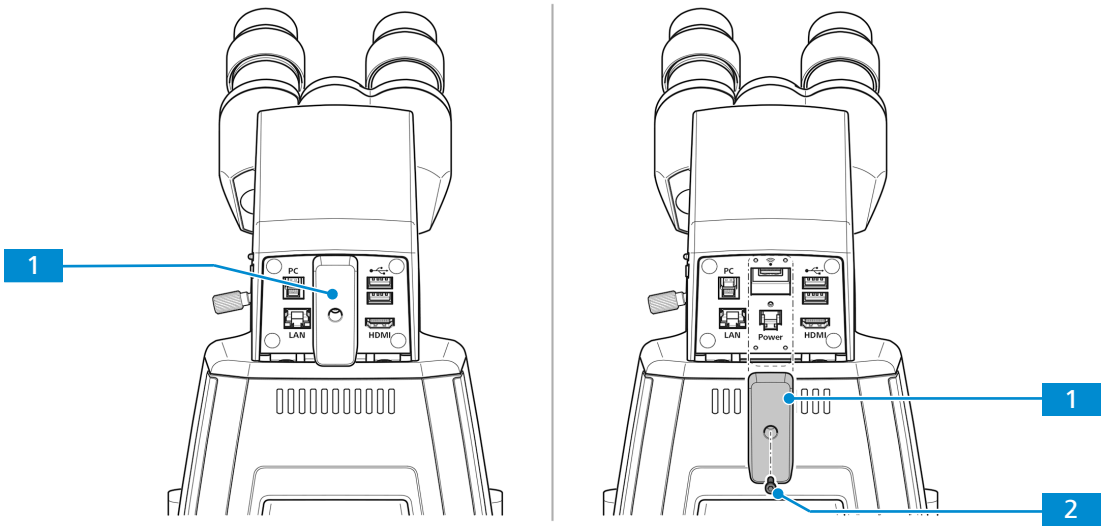


Fig. 18: Cover plate (for covering the USB TYPE A port and the RJ12 port) of the Primostar 3 HD IP camera on the rear side

1 Cover plate
For covering the USB TYPE A port and the RJ12 port

2 Cover plate lock screw
For locking the cover plate

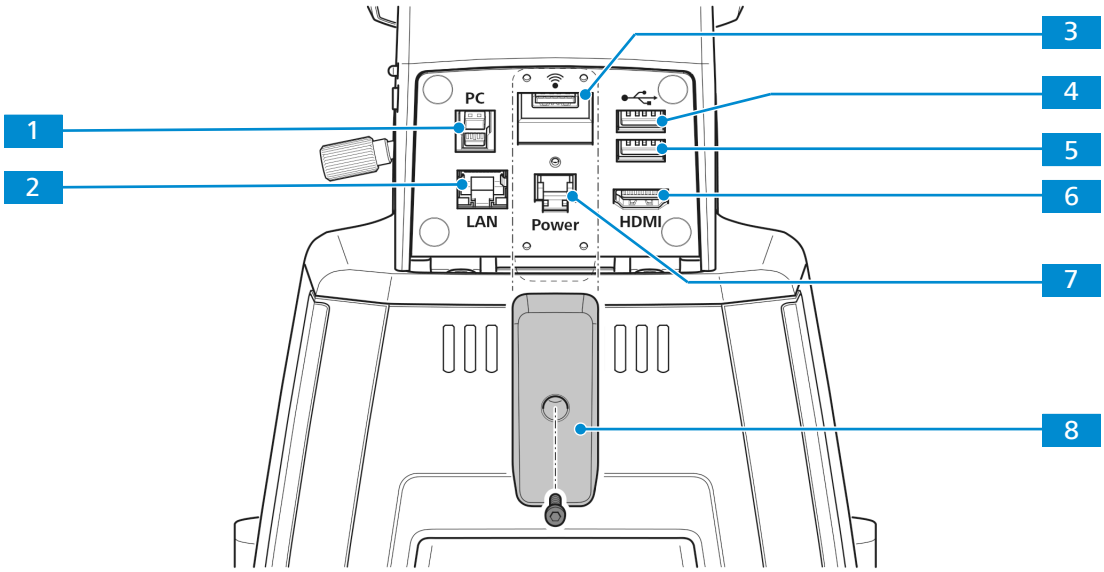


Fig. 19: Connections and special components of the Primostar 3 HD IP camera on the rear side

1 USB TYPE B
For image data transfer to a PC

2 Fast Ethernet port (RJ45)
For communication and image data transfer

3 USB TYPE A
Especially for Wi-Fi adapter

4 USB TYPE A
Optional: For storing image data to memory stick or for mouse or keyboard for OSD control

5 USB TYPE A
Optional: For storing image data to memory stick or mouse or keyboard for OSD control

6 HDMI port
For image data transfer to a monitor

7 RJ12 port
For power supply from stand

8 Cover plate
For covering the USB TYPE A port and the RJ12 port

Function The visualized images of the Primostar 3 HD IP camera may only be used for training and research.

Info

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

3.2.5 Battery Supply Unit

Purpose The rechargeable batteries of the battery supply unit provide power to the microscope when mains power is not available.

Position The battery supply unit is connected via a power supply cable to the back of the microscope.

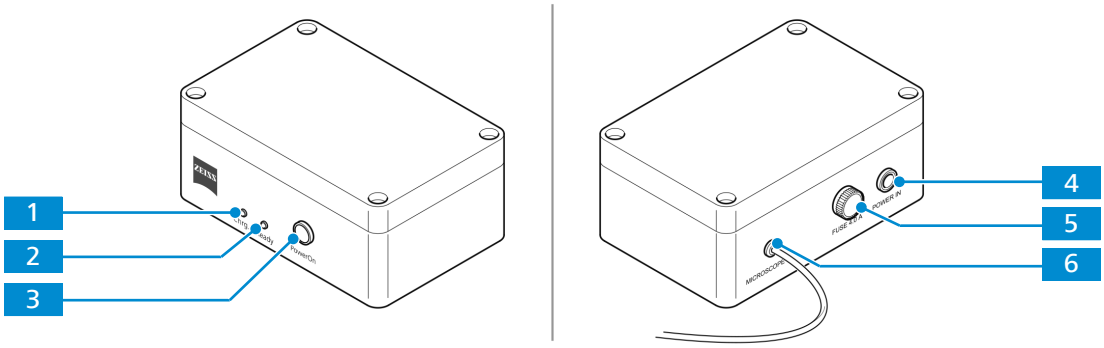


Fig. 20: Controls, indicator lights and connection on the battery supply unit

1 Yellow charge indicator light **Chrg**
Stays illuminated while charging in process
Switches off when fully charged

2 Green power-on light **Ready**
Lights up when the battery supply unit is connected to a power outlet via the plug-in power unit
Switches off if power supply to the supply line is interrupted or in case of power failure. The battery supply unit will automatically switch over to battery power

3 **PowerOn** button
For switching on the battery supply unit if connected to the microscope.

4 **POWER IN** power port
Connection port to power supply line

5 Fuse holder for fuse type T4.0 A/H.

6 Connection cable to the microscope

Function When the battery supply unit is connected to a power outlet via the plug-in power unit, the batteries are charged automatically (green power-on light **Ready** is on).

While charging is ongoing and the microscope is connected to the battery supply unit, the microscope can be used without any restriction. It is provided with voltage through the supply line.

The battery supply unit does not need to be switched off. The unit will switch off automatically as soon as the reflected-light and the transmitted-light illuminators are switched off at the microscope.

Depending on the capacity of the batteries used, the microscope can be operated for about six to eight hours with battery power.

If the battery charge status has reached its critical value, the battery supply unit will switch off the power supply to the microscope.

In order to continue working and to charge the batteries, the unit must be connected to the mains power supply. Shortly before automatic disconnection of the rechargeable battery pack (exhaustive discharge protection) the green power-on light **Ready** will begin to flash - at this point, and no later, the battery pack should be connected to the mains power supply to recharge.

3.2.6 Condenser

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.

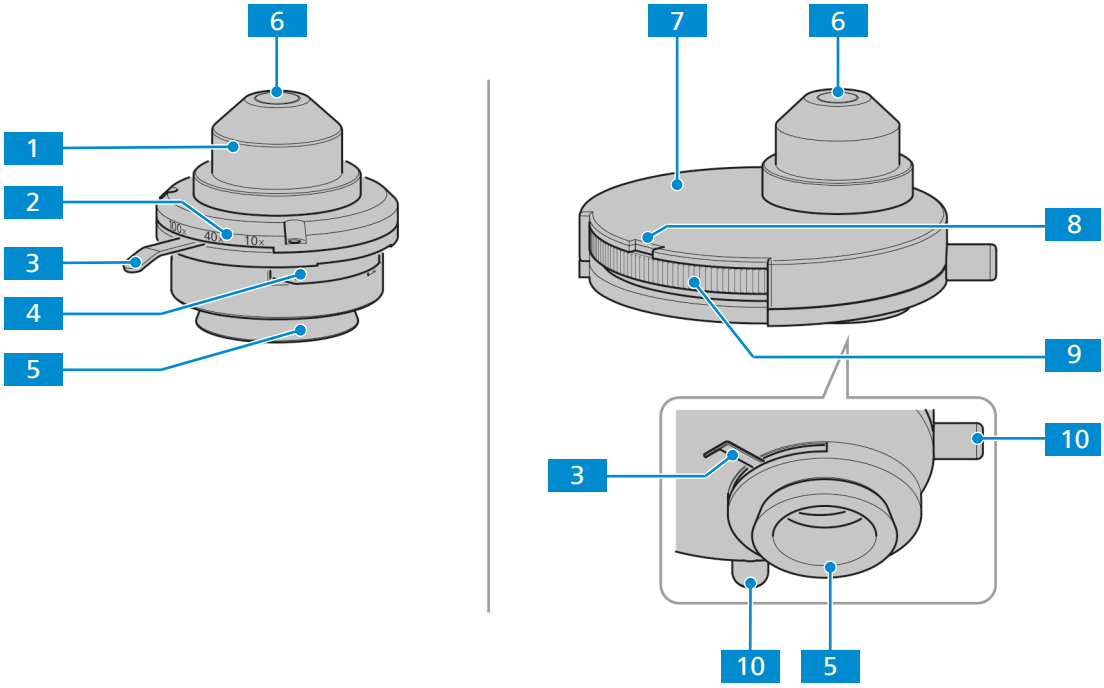


Fig. 21: Abbe condenser and turret condenser

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

3.2.7 Eyepiece

Purpose The eyepieces serve to observe the microscopic image.

Position The eyepieces are inserted into the tube.

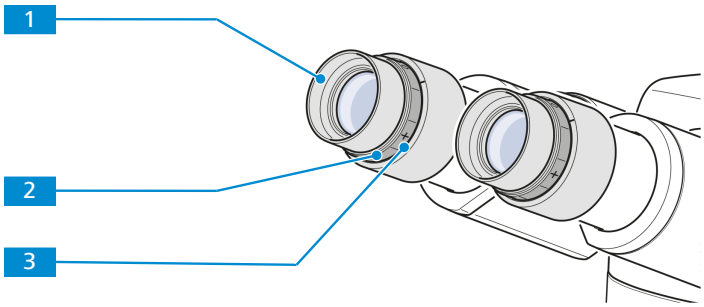


Fig. 22: Eyepiece

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 Fluorescence Illuminator 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.

3.2.8 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 iLED module is used, the 3M Allen wrench can be stored on its rear side.

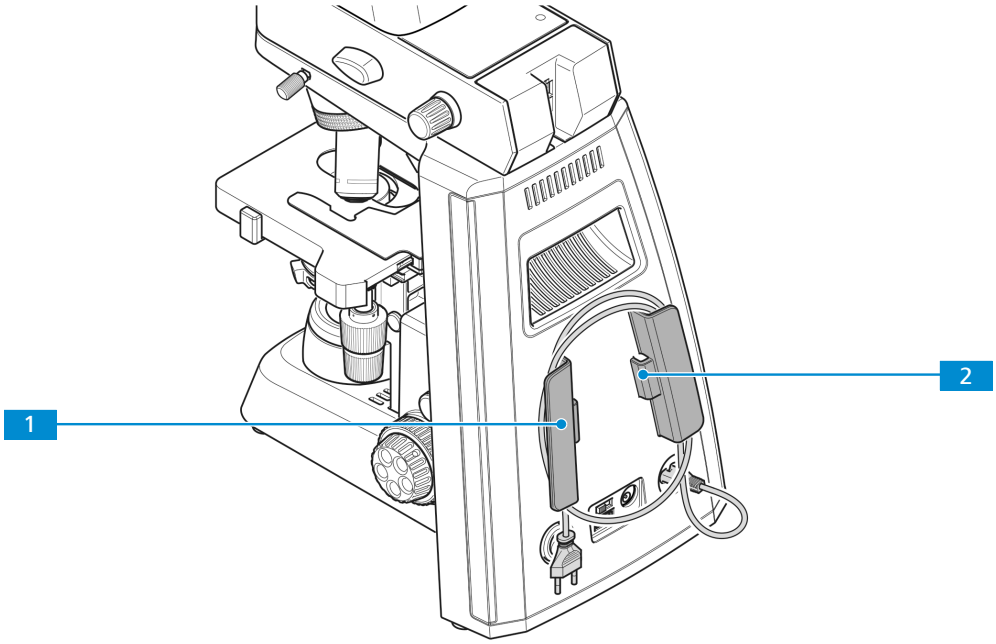


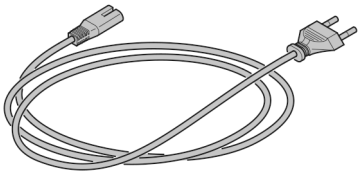
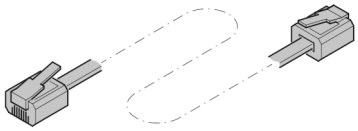
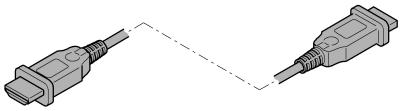
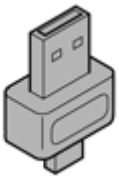
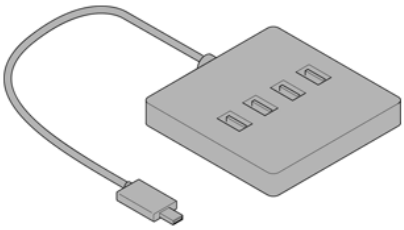
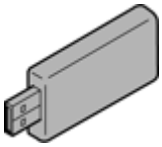
Fig. 23: Storage places

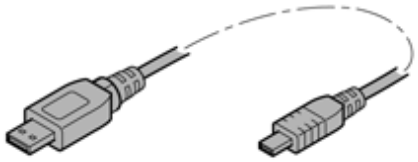
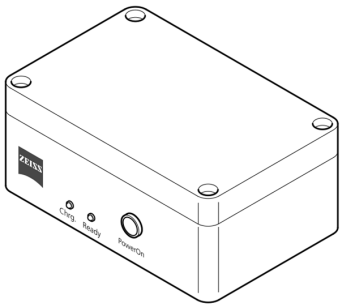
1 Holder for power cable

2 Storage place for phase plate adjustment tool

3.3 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 Primostar 3 HD IP camera and stand for power supply
HDMI cable (can order 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 **OSD** menu
Keyboard (not supplied)		For typing in the **OSD** 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 (can be ordered in demo kit)		Connection between camera and PC
Ethernet cable (can be ordered in demo kit)		Connection between camera and network or WLAN router
Battery supply unit (has to be ordered separately)		Battery supply unit (has to be ordered separately)

Tab. 5: Connecting cables and accessories

3.4 Objective Labeling

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

Feature	Label	Remarks
Magnification	10×	The objective's magnification factor is also expressed by the objective's color ring, see ZEISS color code. The objective magnification multiplied by the eyepiece magnification gives the overall magnification.
Numerical aperture	0.25	The numerical aperture (0.25) multiplied by 1000 represents the maximum useful magnification - above that limit no additional resolution is provided.
Infinitive mechanical tube length	∞	The objective can be used with tubes of any length.

Feature	Label	Remarks
Applicable cover glass thickness	–	The objective can be used with no cover glass or cover glass with a thickness of 0.17 mm.
	0	The objective can be used with no cover glass.
	0.17	The objective can be used with cover glass with a thickness 0.17 mm.

Tab. 6: Obligatory label components

Feature	Label	Remarks
Immersion oil	Oil	The objective can be used with immersion oil.
Phase contrast objective	Ph	The objective can be used in phase contrast microscopy.

Tab. 7: Further label components

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

3.5 On Screen Display (OSD) menu of the Primostar 3 HD IP Camera

When the Primostar 3 HD IP camera is powered and connected to a display device via HDMI, the OSD menu will be shown automatically on the connected display device.

3.5.1 Home Menu

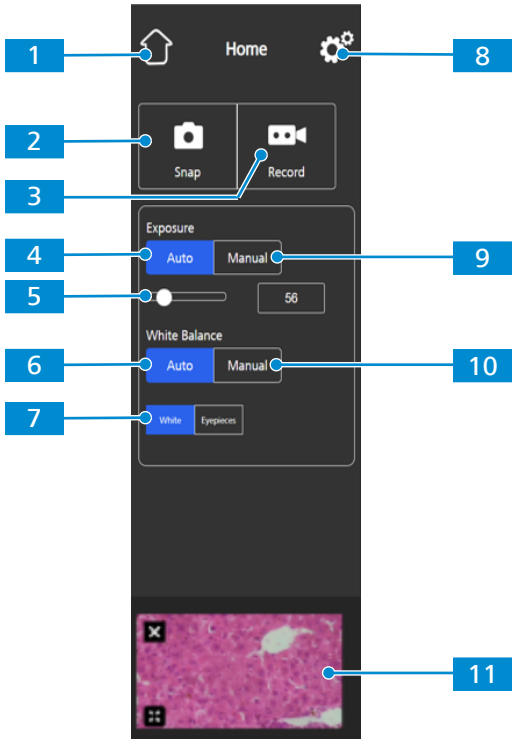


*Fig. 24: **Home** menu, control elements*

1 **Home** button

Opens the **Home** menu.

2 **Snap** button

Snaps a single image.

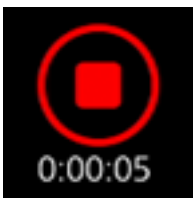
3 **Record** button

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.

4 **Auto Exposure** button

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

5 **Target Intensity** controls

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

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.

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.

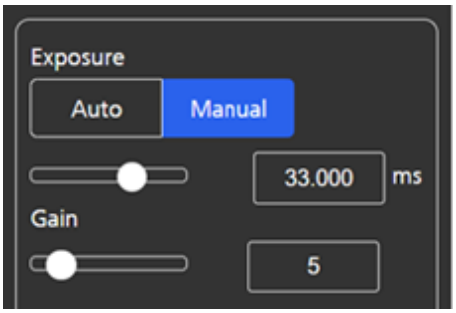
8 **Settings** button

Opens the **Settings** menu.

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:



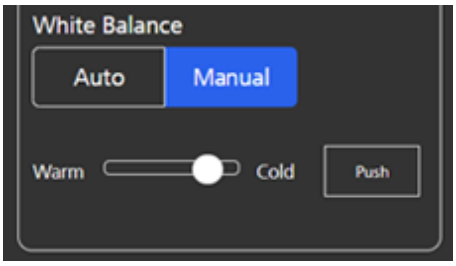
The exposure time can be fine-tuned using the upper slider or input field.

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

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.

3.5.2 Settings Menu

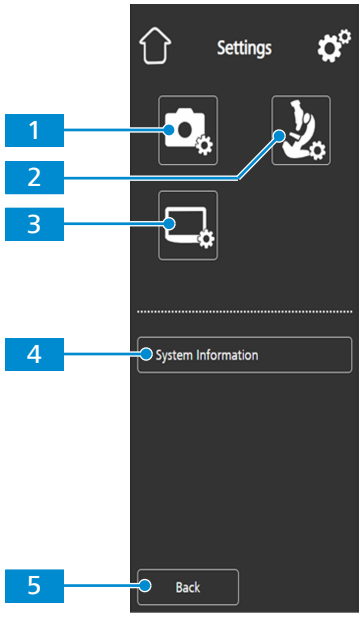


*Fig. 25: **Settings** menu, control elements*

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.

3.5.2.1 Image Settings Menu

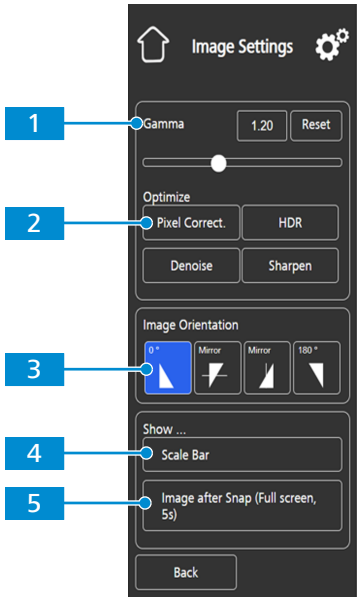


*Fig. 26: **Image Settings** menu, control elements*

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.

2 **Optimize Denoise** button

Reduces noise.

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°

4 **Show ... Scale Bar** button

Shows a scale bar on the live display.

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

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.

3.5.2.2 Microscope System Menu

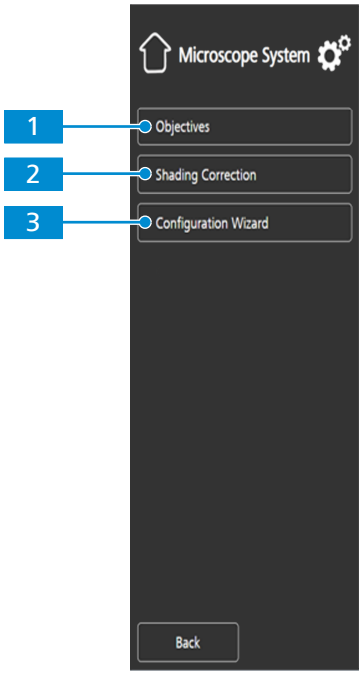
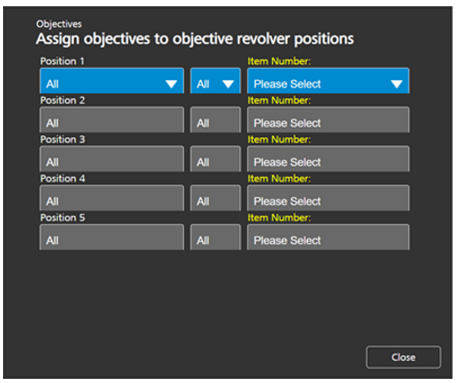


*Fig. 27: **Microscope system** menu, control elements*

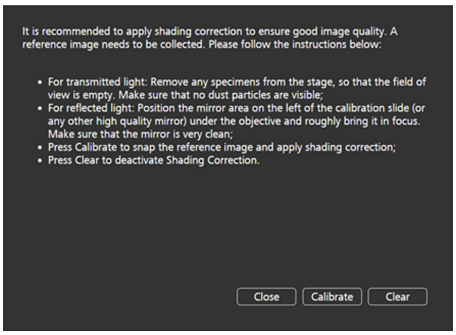
1 **Objectives** button (only for Full-Köhler stands)

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



2 **Shading Correction** button

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



3 **Configuration Wizard** button

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

3.5.2.3 Operating System Menu

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

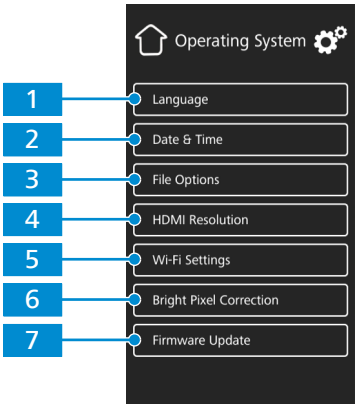


*Fig. 28: **Operating System** menu, control elements*

1 **Language** button

Opens a menu to set English, Chinese or German as operating system language.

2 **Date & Time** button

Opens a menu to set date and time.

3 **File Options** button

Opens a menu to set the filename format and the file type for captured images, see *File Options Menu [▸ 41]*.

4 **HDMI Resolution** button

Opens a menu to set the desired HDMI resolution for live view.

Notes:

Switching from 1080p to 4K must be confirmed by pressing the **Confirm** button.

The camera restarts automatically for the new resolution to take effect.

If the connected monitor does not support 4K it automatically switches back to 1080p after 15 seconds.

5 **Wi-Fi Settings** button (for USB Wi-Fi adapter)

Opens a workflow to set up a wireless connection, see *Wi-Fi Settings Menu [▸ 41]*.

6 **Bright Pixel Correction** button

Opens the pixel correction dialog.

7 **Firmware Update** button

Starts a firmware update when the update file is available via the USB interface, see *Firmware Update of the Primostar 3 HD IP Camera [▸ 89]*.

3.5.2.3.1 File Options Menu

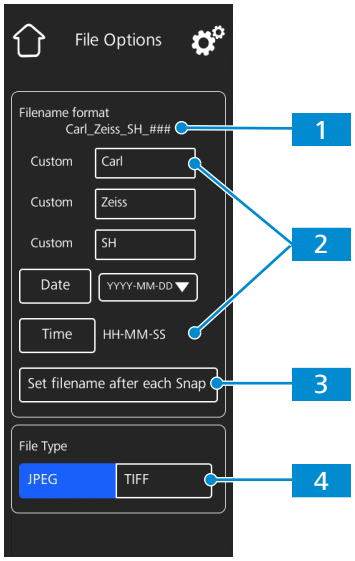


*Fig. 29: **File Options** menu, control elements*

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.

3.5.2.3.2 Wi-Fi Settings Menu

When a compatible USB Wi-Fi adapter is inserted in the Primostar 3 HD IP camera, 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).

4 Installation

Perform only the installation work described in this document. All other installation work not described below 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 Prepare 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 fluorescence illuminator, are delivered in separate packages and must be mounted to the microscope.

Procedure

1. Remove the microscope from the transport case and place it on the work table.
2. Retain the original packaging for longer-period non-use storage of the instrument or for return to the manufacturer.

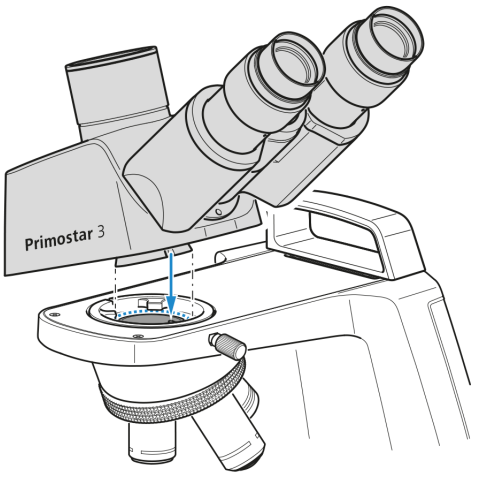
4.3 Installing Additional Components

4.3.1 Installing or Changing the Tube

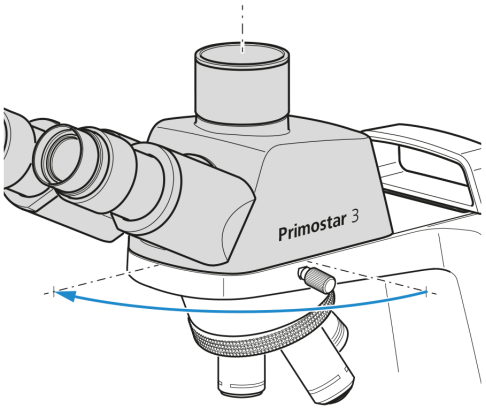
Prerequisite ✓ The microscope is unplugged from the mains power.

Procedure

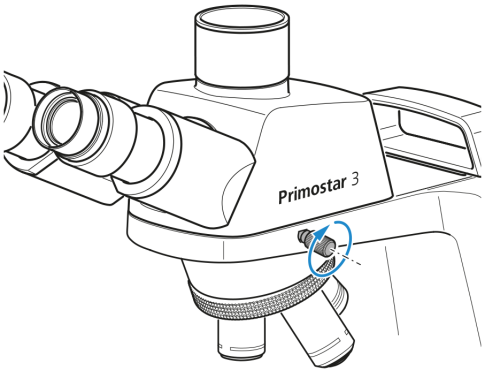
1. Insert the tube to be installed into the stand.
   → The eyepieces must point to the right and its dovetail mount must be slightly inclined, under the two holding elements.



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.

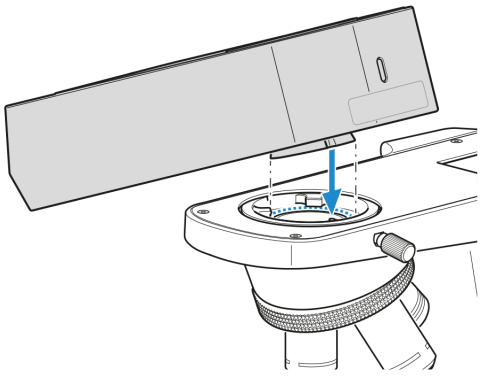
4.3.2 Installing the Reflected-light Fluorescence Illuminator iLED onto the Stand

Prerequisite

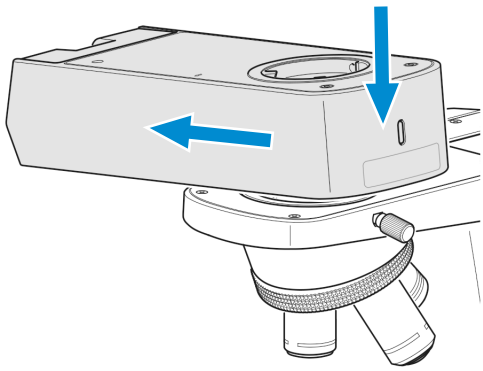
- ✓ The microscope is unplugged from mains power.
- ✓ Stand without small hand lift.
- ✓ RJ12 cable is available.

Procedure

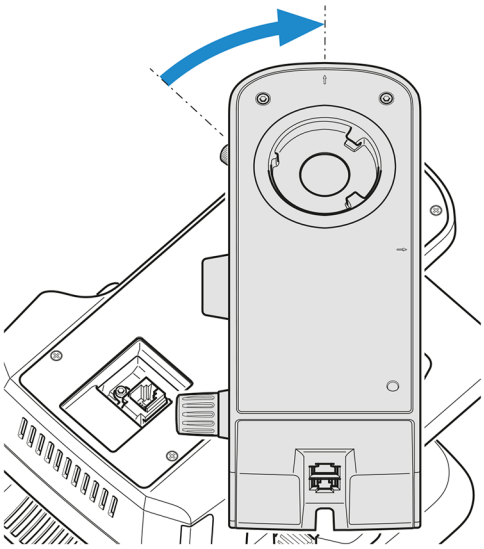
1. Insert the reflected-light illuminator at correct angle and slightly inclined with its dovetail mount into the stand.



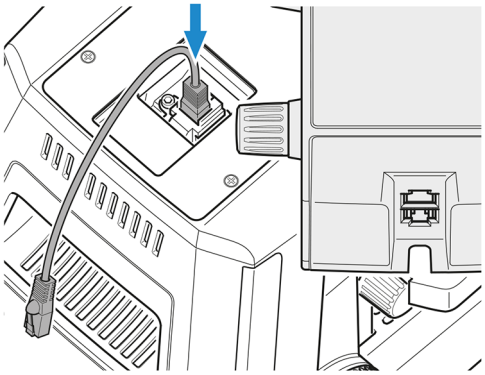
2. Position the reflected-light illuminator horizontally.



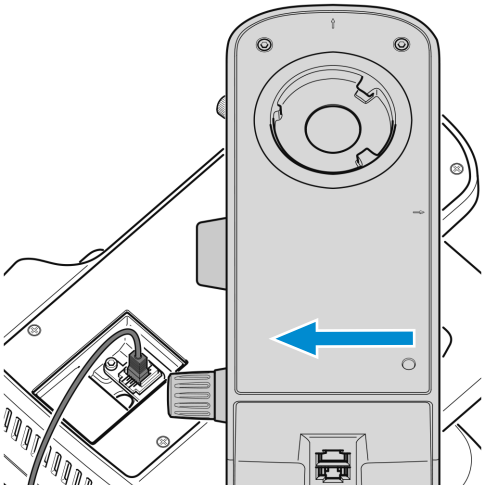
3. Turn the reflected-light illuminator clockwise to face backwards with the dovetail mount in the stand.



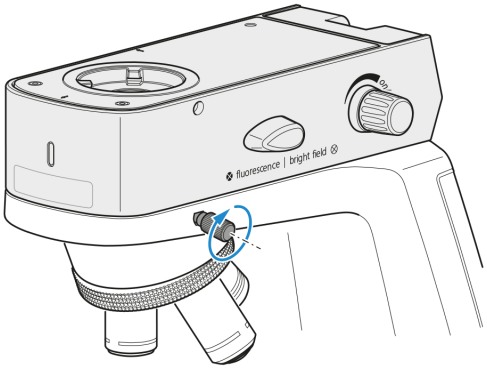
4. Plug the RJ12 cable into the RJ12 female connector port of the stand.



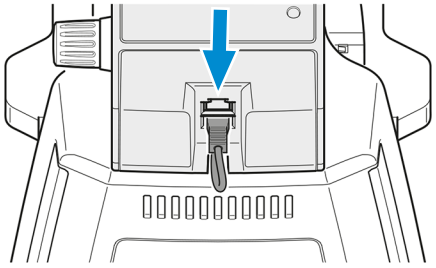
5. Align the reflected-light illuminator to the outer edges of the stand.



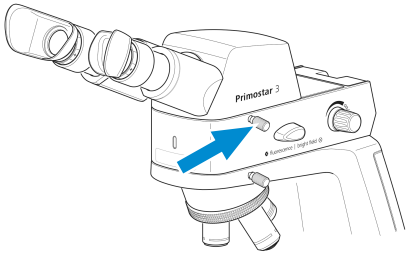
6. Tighten the set screw of the stand.



7. Plug the other side of the RJ12 cable into the RJ12 female connector port of the reflected-light fluorescence illuminator.



8. Hide the RJ12 cable at the rear side groove of the reflected-light fluorescence illuminator.
9. Place the tube onto the reflected-light fluorescence illuminator (see *Installing or Changing the Tube [▸ 43]*) and tighten the clamping screw of the reflected-light illuminator.



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

Info

Special eyecups with light protection (see *Changing the Eyecups [▸ 57]*) 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.

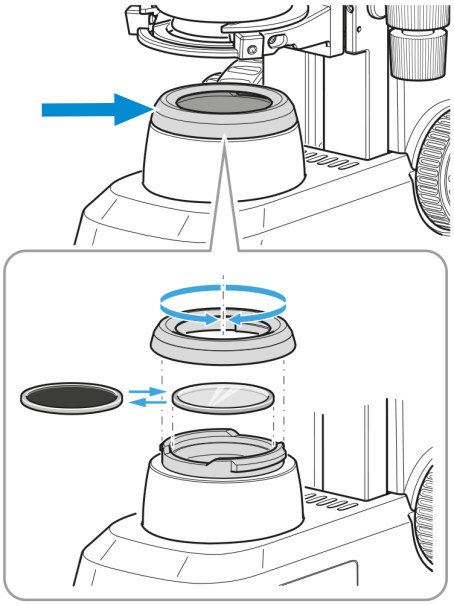
Info

For mounting reflected-light fluorescence illuminator iLED on stands with small hand lift, please contact an authorized ZEISS service representative.

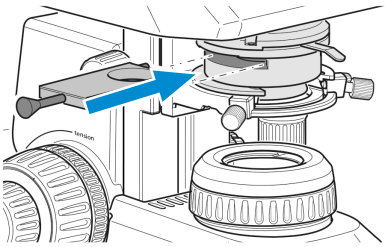
4.3.3 Attaching or Removing Yellow Filter or TL Cover Plate (Fixed Köhler Stand)

Procedure

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



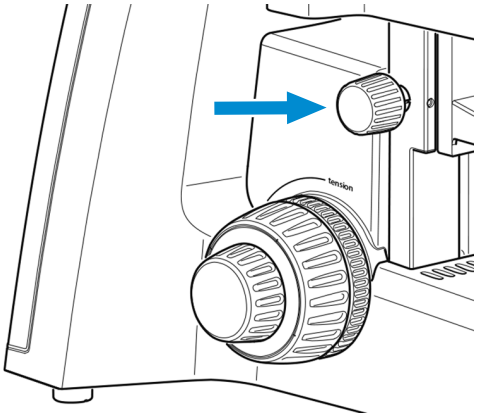
2. Place the yellow filter onto the mounting surface of the luminous-field diaphragm or remove it if necessary.
3. Re-attach the cover cap to the luminous-field diaphragm and lock it.
4. If required, place the TL cover plate into the Abbe condenser phase plate slot.



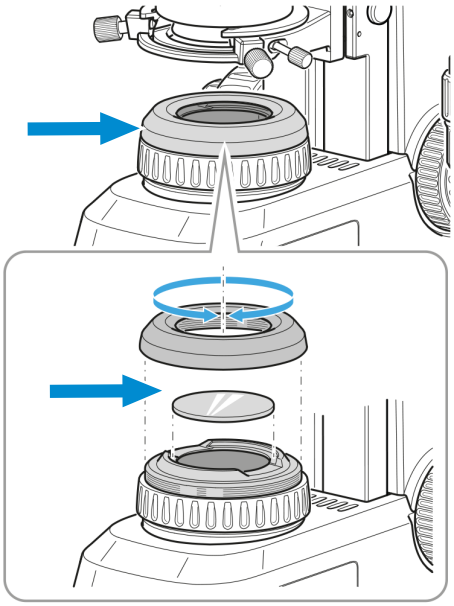
4.3.4 Inserting Color Filters (Full Köhler Stand)

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.

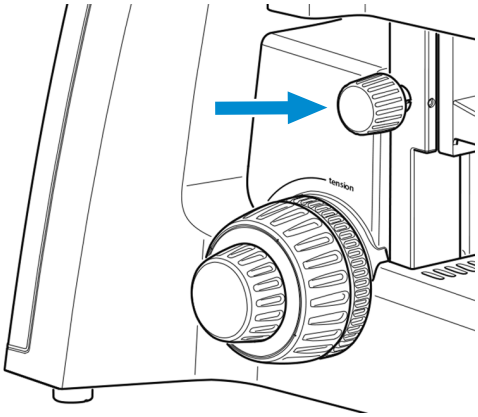


3. Put the desired filter – yellow, green or blue – onto the mounting surface of the luminous-field diaphragm.
4. Screw the cover cap back into place.

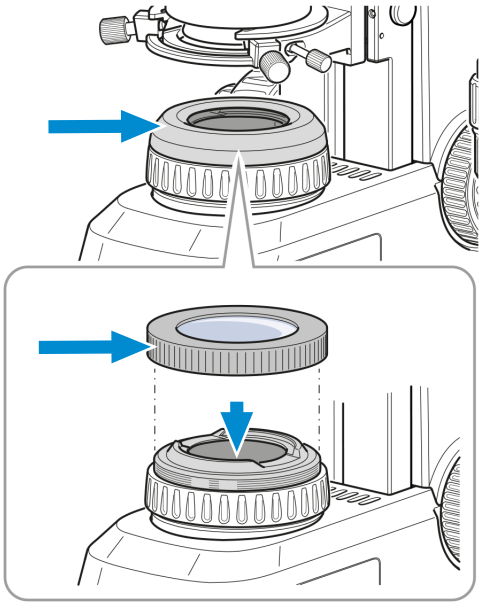
4.3.5 Installing the Polarizer Plate (Full Köhler Stand)

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.



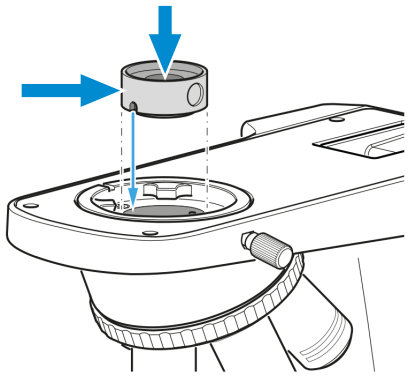
3. Put the polarizer plate onto the luminous-field diaphragm.
   → The position stop on the polarizer plate has to match with the position stop on the luminous-field diaphragm.

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.

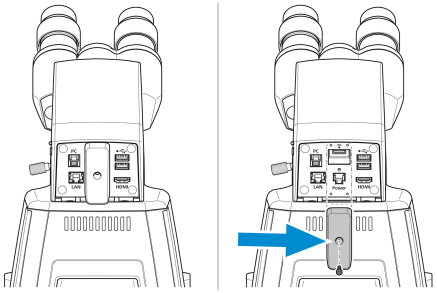
4.3.7 Installing the Primostar 3 HD IP Camera

Prerequisite

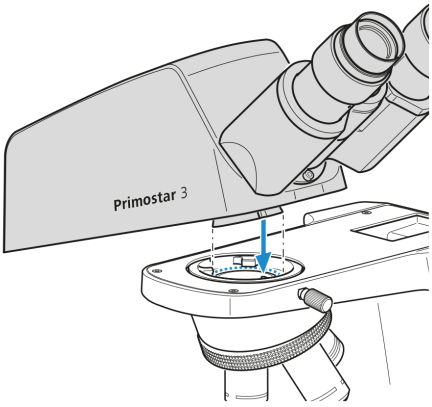
- ✓ The microscope is unplugged from mains power.
- ✓ Stand without small hand lift
- ✓ RJ12 cable
- ✓ If needed, mount the reflected-light fluorescence illuminator iLED onto the stand first, see *Installing the Reflected-light Fluorescence Illuminator iLED onto the Stand [▸ 44]*. Then, mount the Primostar 3 HD IP camera onto the reflected-light fluorescence illuminator iLED in the same way as described below.

Procedure

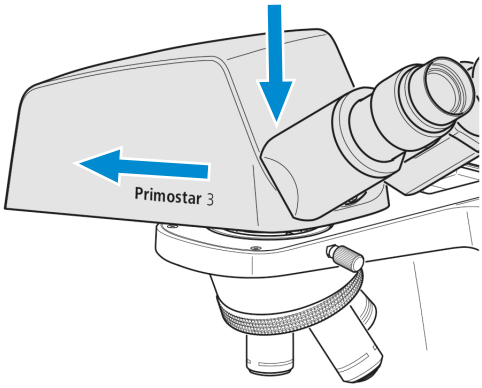
1. Remove the tube, see *Installing or Changing the Tube [▸ 43]*.
2. Unscrew the cover plate.



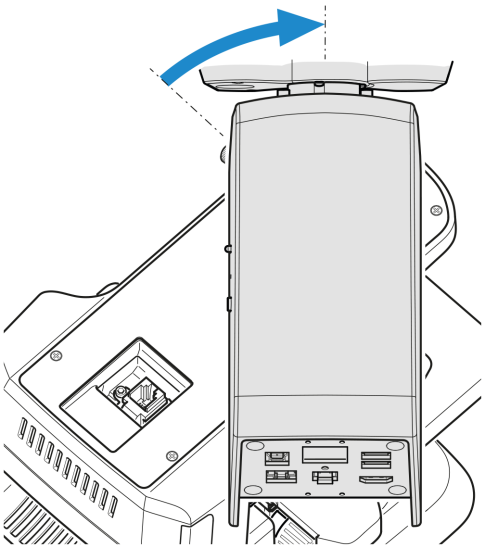
3. Insert the Primostar 3 HD IP camera, at the correct angle and slightly inclined with its dovetail mount into the stand.



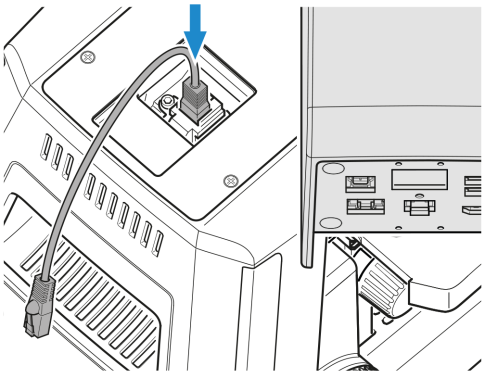
4. Position the Primostar 3 HD IP camera horizontally.



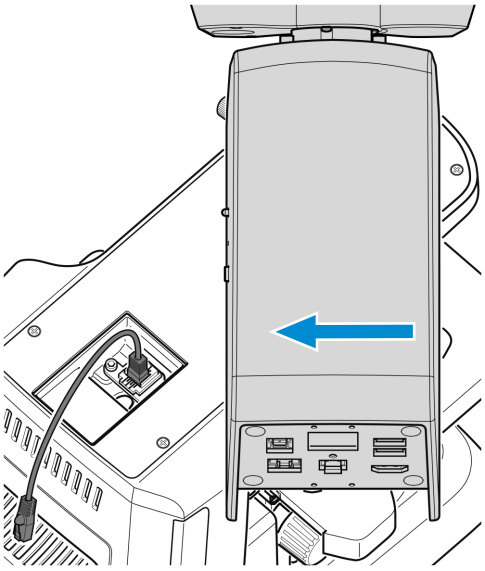
5. Turn the Primostar 3 HD IP camera clockwise to face backwards with the dovetail mount in the stand.



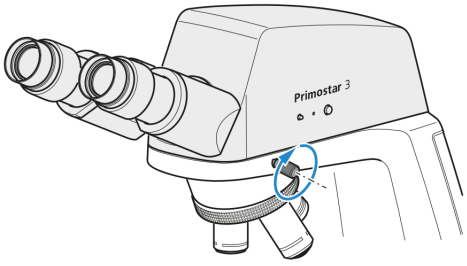
6. Plug the RJ12 cable into the RJ12 female connector port of the stand.
If the reflected-light fluorescence illuminator iLED is used, plug the RJ12 cable into the upper RJ12 female connector port of the reflected-light fluorescence illuminator iLED.



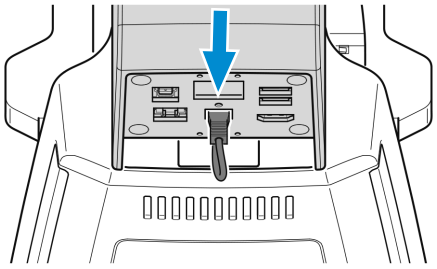
7. Align the Primostar 3 HD IP camera to the outer edges of the stand.



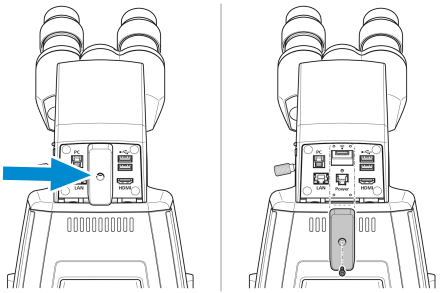
8. Tighten the set screw of the stand.



9. Plug the other side of the RJ12 cable into the RJ12 female connector port of the Primostar 3 HD IP camera.



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



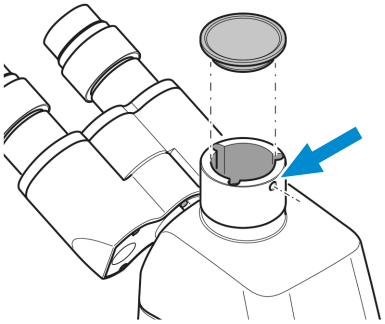
4.3.8 Installing a Camera to the Trinocular Tube

Prerequisite

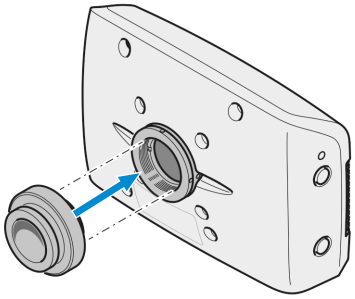
- ✓ A trinocular tube (photo tube) is mounted on the microscope.
- ✓ A camera adapter P95-C 2/3" 0.65x or P95-C 1/2" 0.5x

Procedure

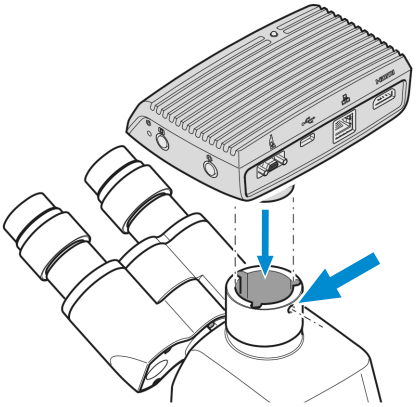
1. Loosen the clamping screw and remove the dust cap from the tube.



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.

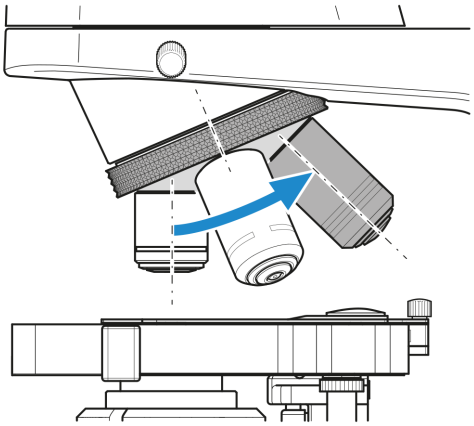
Info

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

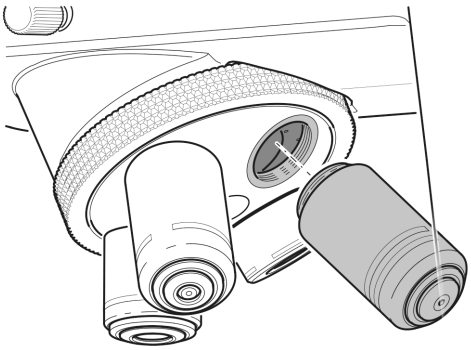
4.3.9 Replacing Objectives

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

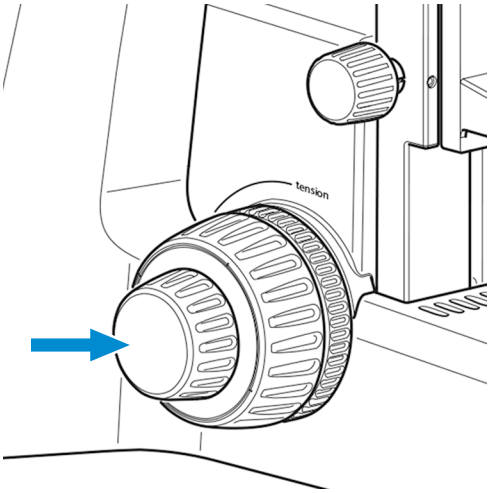
The mirror serves to illuminate the specimen if no power outlet is available.

Parts and Tools Hex Key

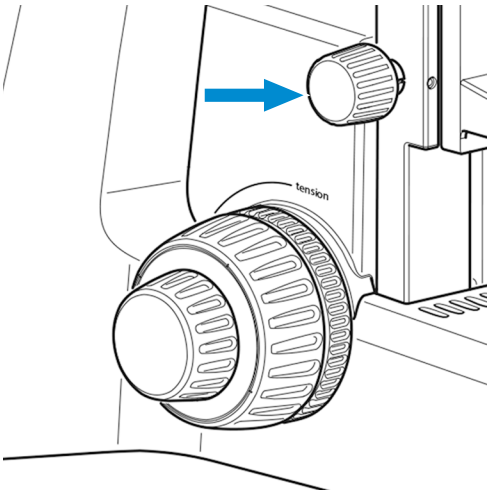
Prerequisite ✓ Full-Köhler stand

Procedure

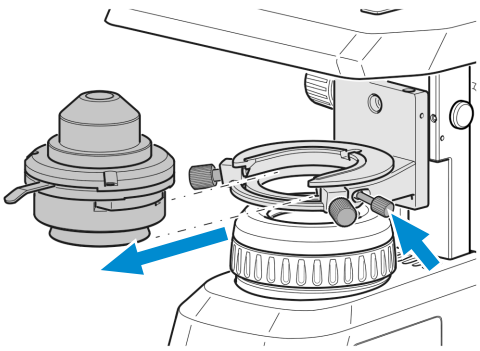
1. Turn coarse focusing drive to move the stage carrier to the upper stop position.



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 frontward.
   → 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

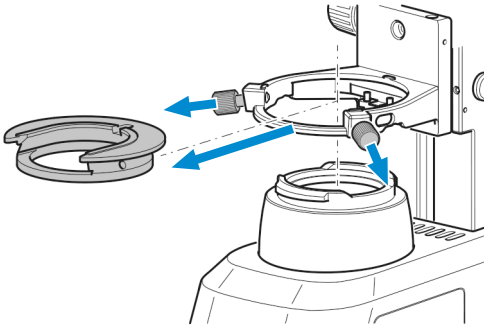
The mirror serves to illuminate the specimen if no power outlet is available.

Parts and Tools Hex Key

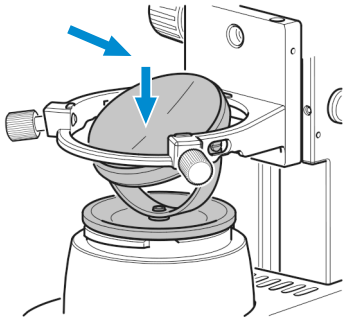
Prerequisite ✓ Fixed-Köhler stand or Full-Köhler stand

Procedure

1. Remove the cover cap from the luminous-field diaphragm, see *Attaching or Removing Yellow Filter or TL Cover Plate (Fixed Köhler Stand) [▸ 47]*.
2. Remove the condenser, see *Installing/Removing the Condenser [▸ 54]*.
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

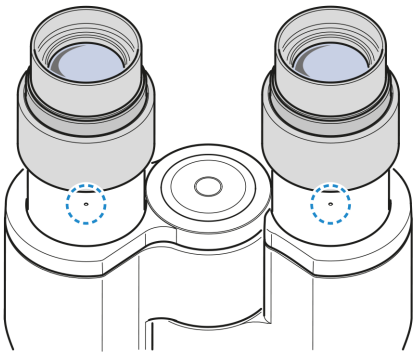
Follow these instructions in reverse order to remove the mirror.

4.3.12 Inserting an Eyepiece Pointer or an Eyepiece Micrometer

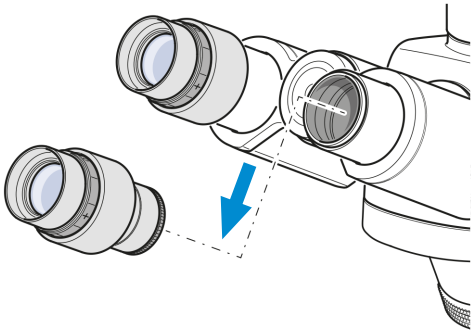
Parts and Tools Hex Key, 1.0 mm

Procedure

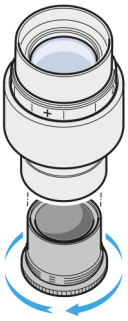
1. Use an Allen wrench to loosen the set screw on the binocular body from below.



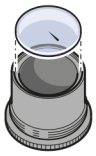
2. Remove the appropriate eyepiece.



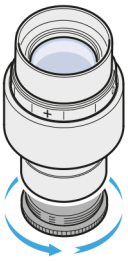
3. Unscrew the stop from the eyepiece by hand.



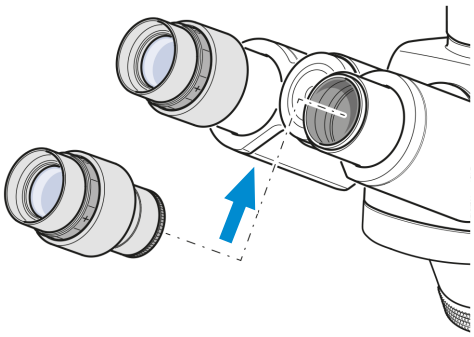
4. Insert the eyepiece pointer or the eyepiece micrometer into the eyepiece (with the coated side facing your eyes).



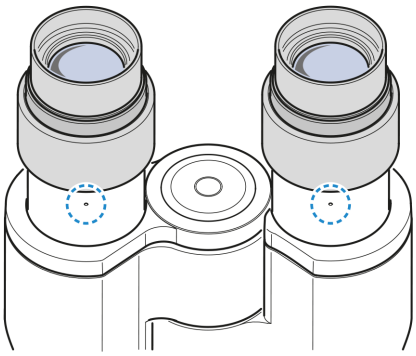
5. Screw in the eyepiece stop again.



6. Insert the eyepiece into the tube.



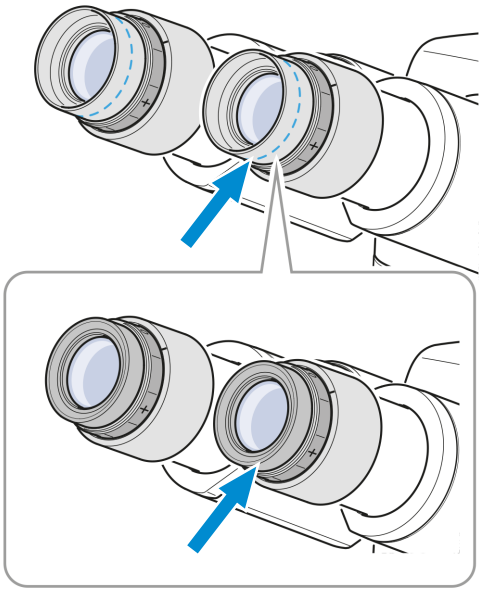
7. Align it as desired and tighten the set screw.



4.3.13 Folding Over the Eyecups

Procedure

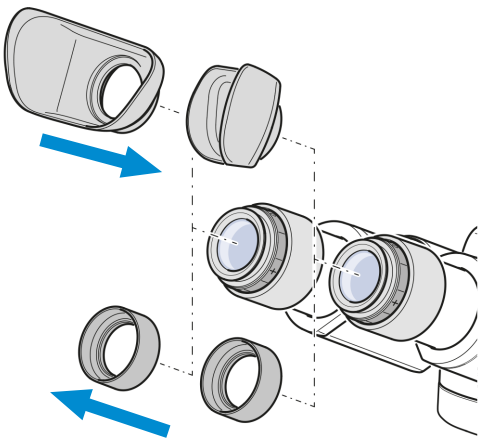
1. If required, fold over the rubber eyecups.



4.3.14 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.

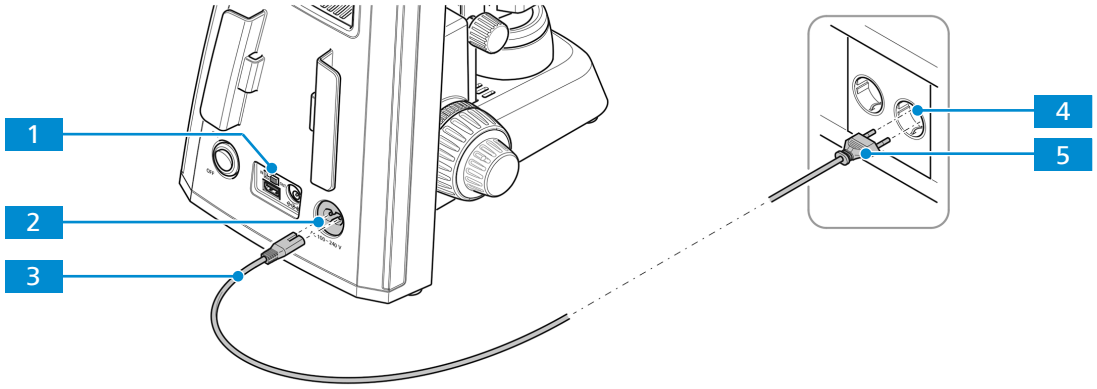


Fig. 30: Connecting the microscope to the mains power supply

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 the Battery Supply Unit

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

Prerequisite

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

✓ Rechargeable batteries are inserted in the battery supply unit.

✓ The batteries are charged.

Procedure

1. Plug the connector 3 of the battery supply unit into the connection port 2 of the stand.

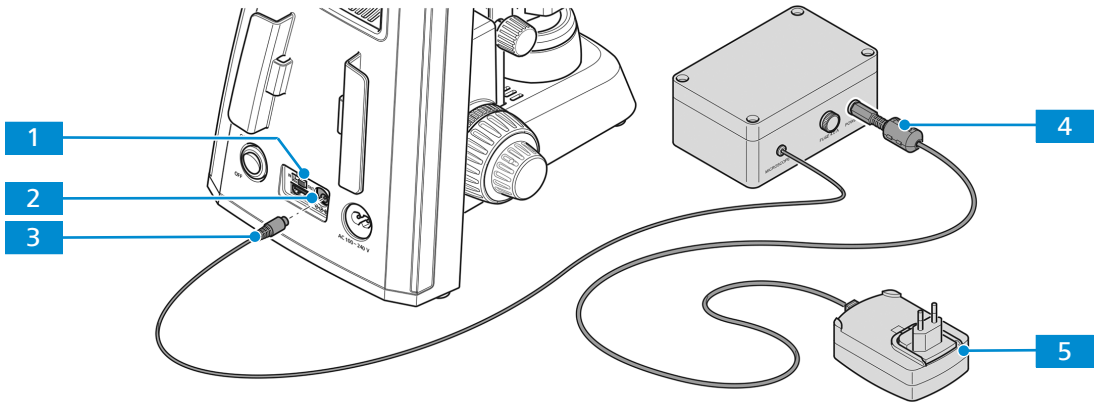


Fig. 31: Connecting the microscope to the battery supply unit

2. Make sure the **DC 5V** switch 1 is in the **OUT** position.

3. If charging is required, plug the connector 4 of the plug-in power supply into the battery supply unit.
4. Connect the plug-in power supply 5 to the mains power supply.

4.4.3 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.

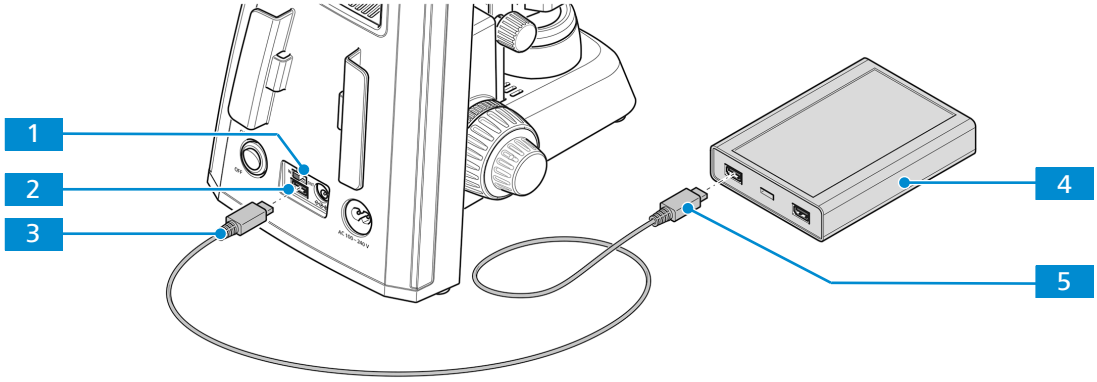


Fig. 32: Connecting the microscope to a power bank

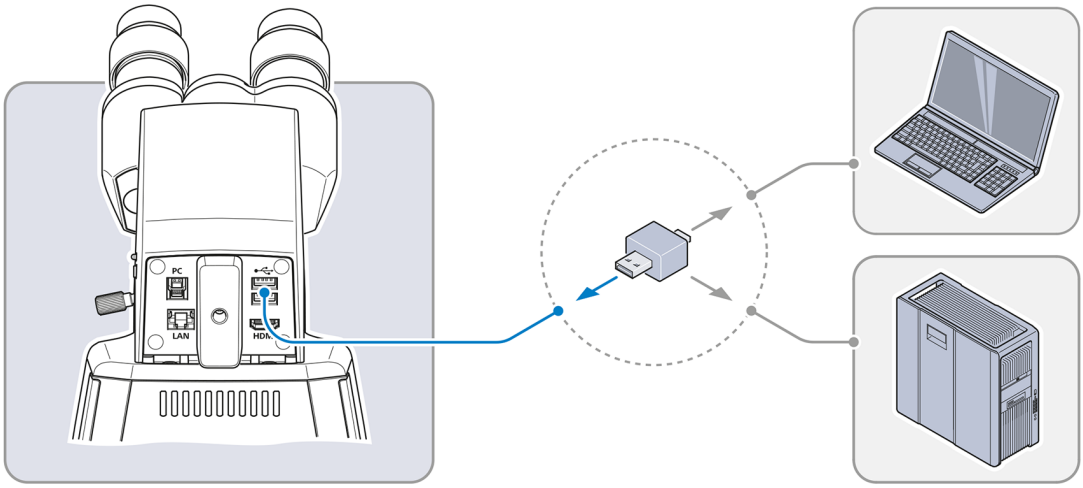
2. Switch the **DC 5V** switch 1 to the **IN** position.
3. Plug the other side of the USB Type A to A cable 5 into the appropriate port of the power bank 4.

4.5 Connecting the Primostar 3 HD IP Camera to a Storage Medium or Imaging Device

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 Primostar 3 HD IP camera.



Info

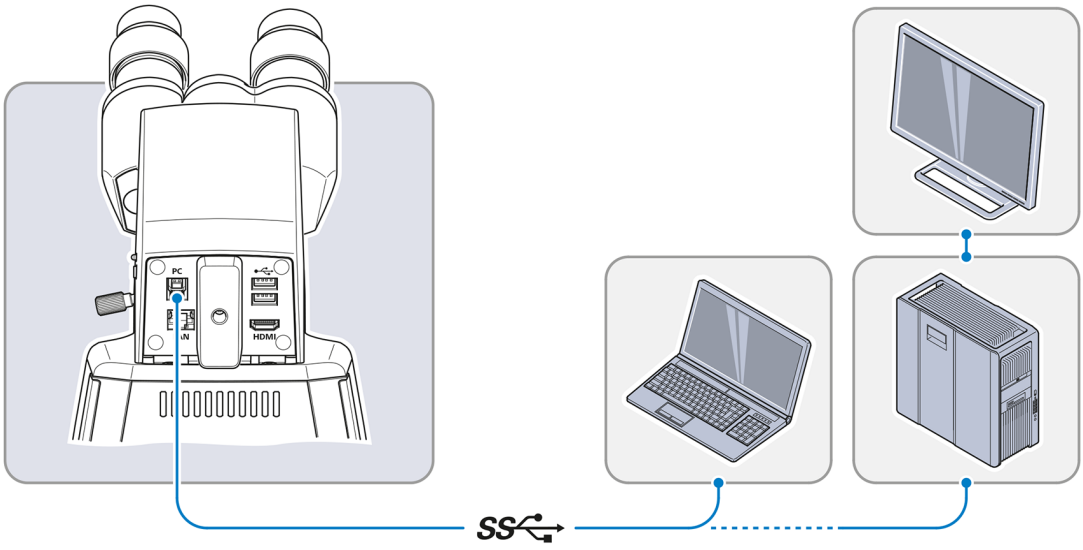
To view the captured images or videos connect the USB flash drive to a PC or laptop.

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)

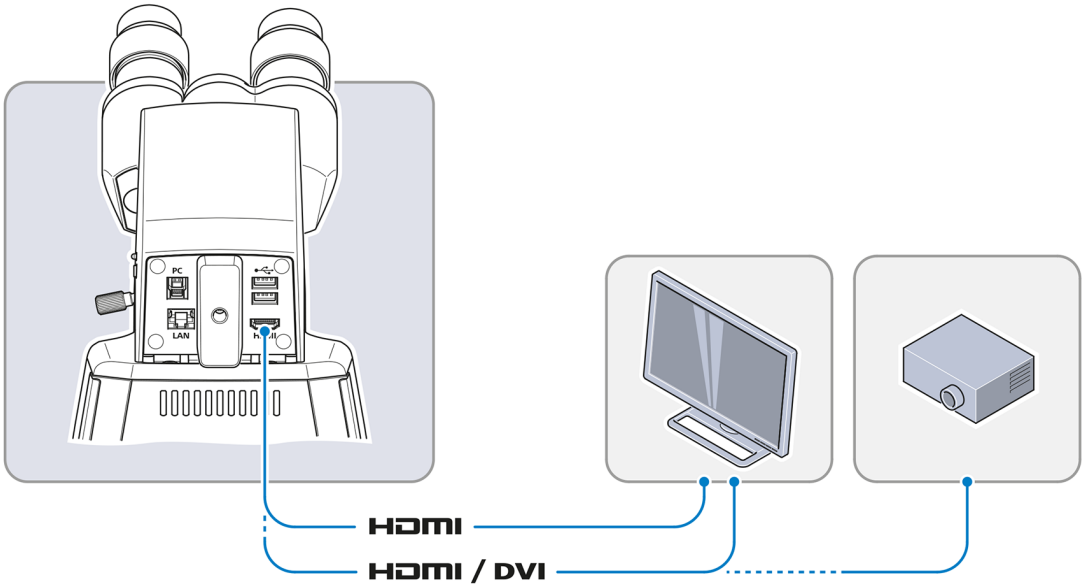
The Primostar 3 HD IP camera can be connected to a monitor, TV or projector for visualization of the live image data and for operating the On Screen Display menu (OSD) functions.

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 be connected.
- ✓ If connecting to a monitor, please 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 will be required for the reproduction of image data.

Procedure

1. Connect the monitor/projector to the Primostar 3 HD IP camera 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 Primostar 3 HD IP Camera into a Network

The Primostar 3 HD IP camera 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 will be 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.

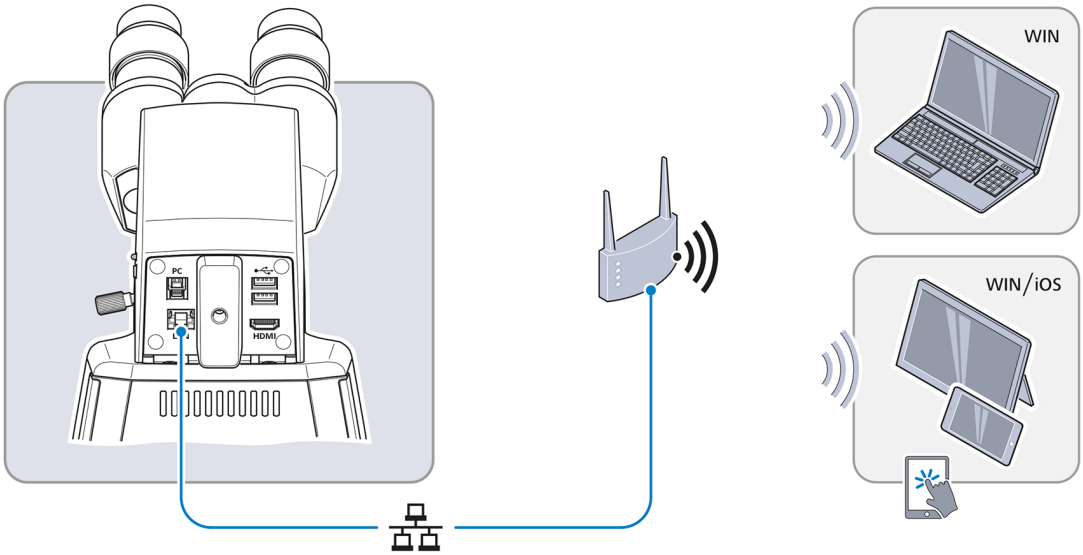
To create a separate microscope WLAN set up, visit **www.zeiss.com/micro-apps** for further information.

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 Camera via Ethernet

Procedure

1. Insert the Ethernet cable into the jack on the reverse side of the Primostar 3 HD IP camera.

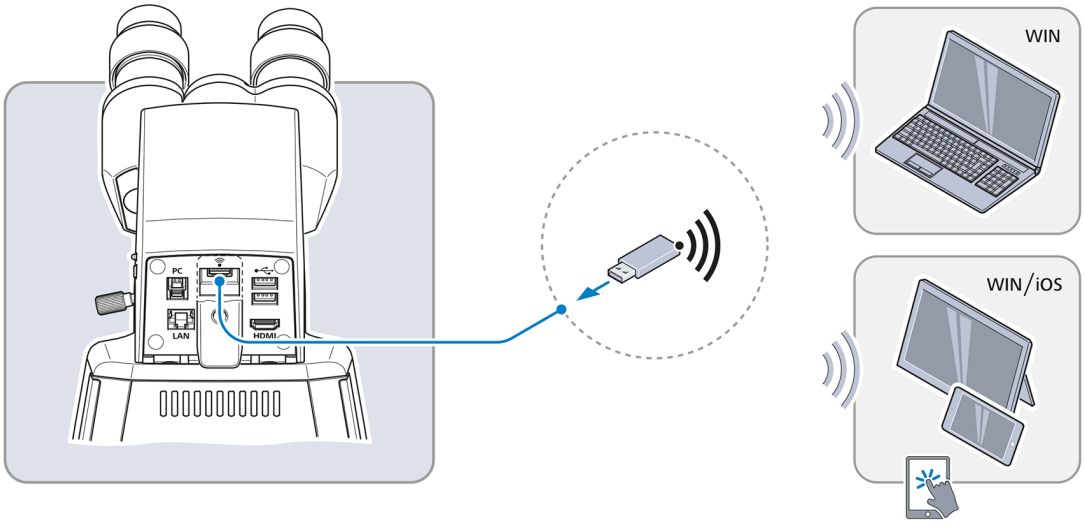


2. Insert the Ethernet cable's opposite connector into the corresponding socket on your WLAN router.
3. Switch on the router.
   → **Labscope** can recognize the network (network name and password are the same as in the WLAN router setting).

4.5.4.2 Connecting the Camera 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 Primostar 3 HD IP camera, for example **Primostar3_F9A919**)
   Password: ZEISS1846

Info

When a compatible USB Wi-Fi adapter is inserted into the Primostar 3 HD IP camera tube, 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 Software for Use of the Primostar 3 HD IP Camera

To capture images with the Primostar 3 HD IP camera tube to a PC or iPad, you have the following options:

- Installation of **Labscope** for Windows to PC
- Installation of **ZEISS ZEN Lite** software 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** for free download.
2. Install the Labscope App as described.

4.6.2 Installing the ZEISS ZEN lite Software on PC

Prerequisite ✓ WINDOWS PC is required.

Procedure
1. Go to **www.zeiss.com** for free download.
2. Install the **ZEISS ZEN Lite** software as described.

4.6.3 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 decribed.

5 First Operating Steps

This chapter describes the switching on/off as well as the first operating steps of the Microscope. Further information on operation is available in the Online Help of your software and the applicable instruction manuals, if available.

5.1 Prerequisites for Commissioning and Operation

Read the instruction manual carefully before commissioning and keep the manual for further use.

- Basic training and safety briefing successfully completed.
- Chapter Safety read and understood.
- Familiar with general Windows® based programs.

5.2 Switching on the Microscope

5.2.1 Microscope is directly connected to the Mains Power Supply

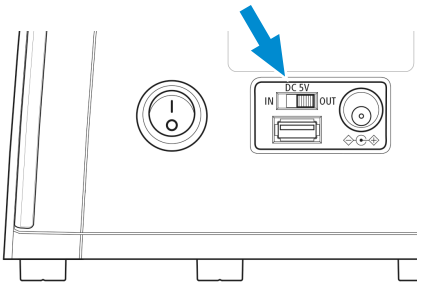
Prerequisite

✓ The microscope and all components to be used are completely installed.

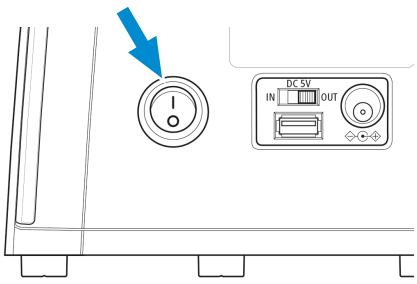
✓ The microscope is connected to the mains power supply.

Procedure

1. Ensure the **DC 5V** switch is in the **OUT** position.
   → The **DC 5V** switch is only available on Fixed-Köhler stands.



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



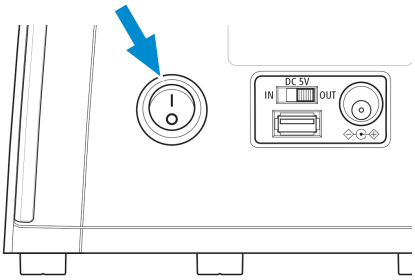
5.2.2 Microscope is connected to the External DC Power Supply (12 V)

Prerequisite

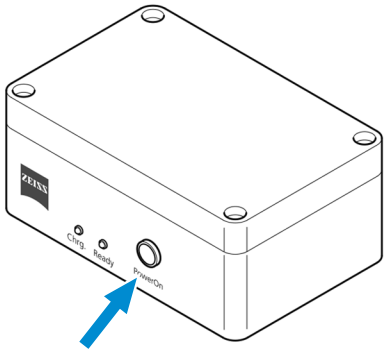
- ✓ The microscope and all components to be used are completely installed.
- ✓ The battery supply unit is charged and connected to the microscope.

Procedure

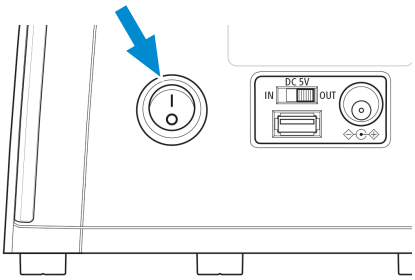
1. Ensure the **DC 5V** switch is in the **OUT** position.



2. Switch on the battery supply unit.



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



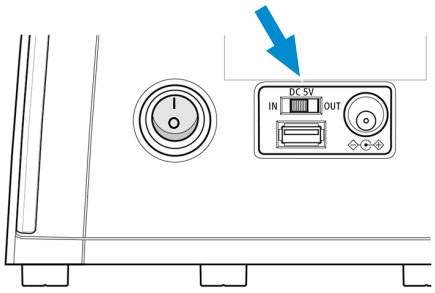
Info

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

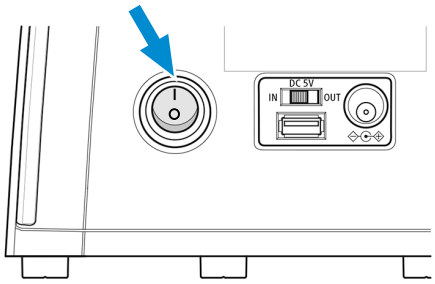
5.2.3 Microscope is connected to a Power Bank

Prerequisite
- ✓ The microscope and all components to be used are completely installed.
- ✓ The power bank is charged and connected to the microscope.

Procedure
1. Ensure the **DC 5V** switch is in the **IN** position.



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



5.3 Adjusting the Tube

The following action comprises several individual action sequences:

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

Procedure
1. *Setting the Interpupillary Distance [▸ 67]*
2. *Setting the Viewing Height [▸ 68]*
3. *Setting the Eyepiece with Eyepiece Pointer or Eyepiece Micrometer [▸ 68]*

5.3.1 Setting the Interpupillary Distance

Info

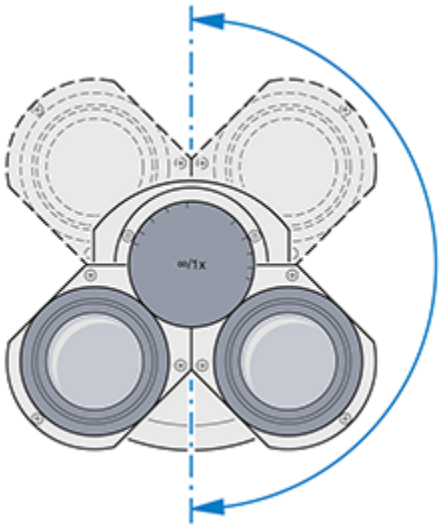
The adjustment of the interpupillary distance is correct when you see only one round image while looking through the two eyepieces.

Procedure
1. Rotate the eyepiece tubes symmetrically toward or away from one another.

5.3.2 Setting the Viewing Height

Procedure

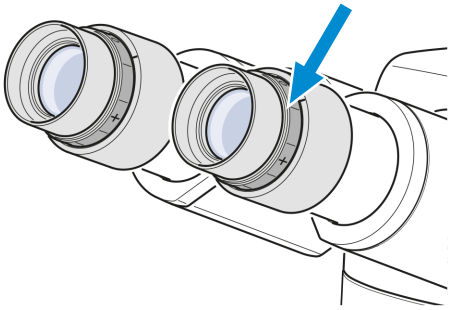
1. Swivel the eyepieces a full 180° upwards or downwards.



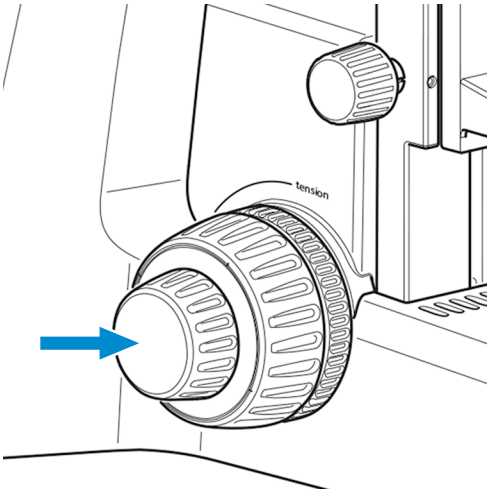
5.3.3 Setting the Eyepiece with Eyepiece Pointer or Eyepiece Micrometer

Procedure

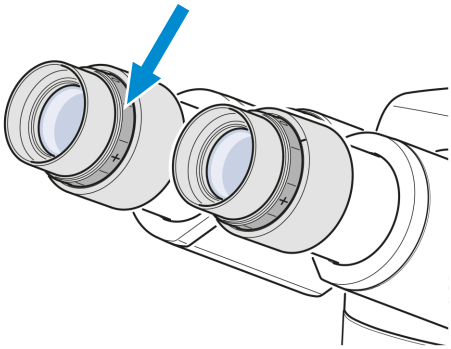
1. Put the eyepiece with pointer or micrometer into the tube and fix it with the set screw.
2. Turn the focusing ring of the eyepiece to focus on the wedge-shaped figure of the eyepiece pointer.



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

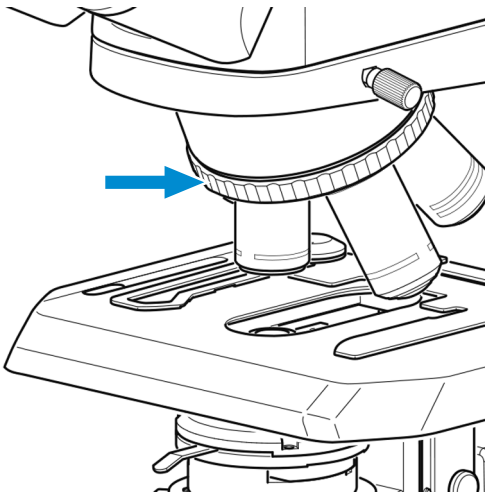
Info

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

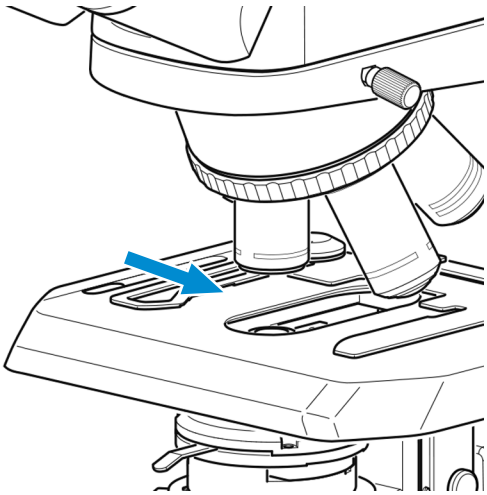
Prerequisite
- ✓ The microscope is adapted to the user, see *Adjusting the Tube [▸ 67]*.
- ✓ A 10x objective for use with cover glass of 0.17 mm thickness is mounted.

Procedure

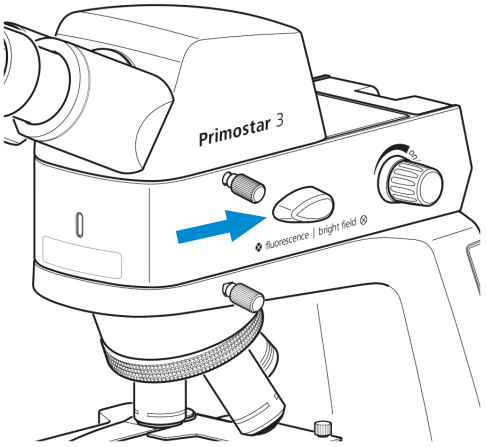
1. Rotate the 10x objective into the light path using the knurled ring of the nosepiece.



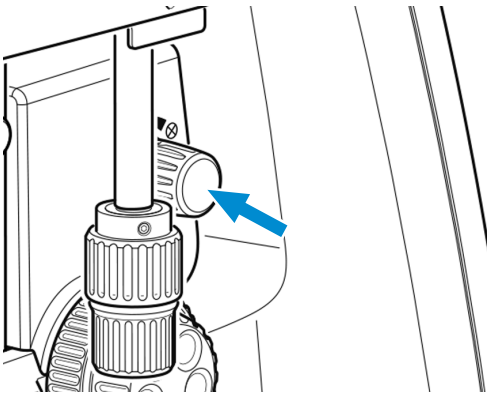
2. Place the high-contrast specimen slide on the stage and fix it using the spring lever of the specimen holder.



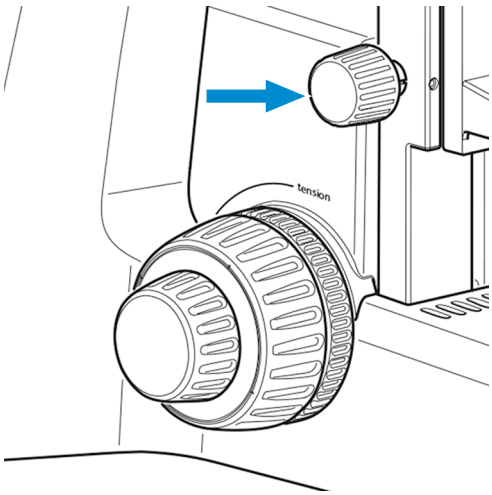
3. If applicable, move all phase contrast or darkfield elements out of the light path.
4. If the microscope stand is equipped with the turret condenser, move turret to **BF** position.
5. When using the Reflected-light Fluorescence Illuminator iLED, turn the transmitted light/reflected light changeover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



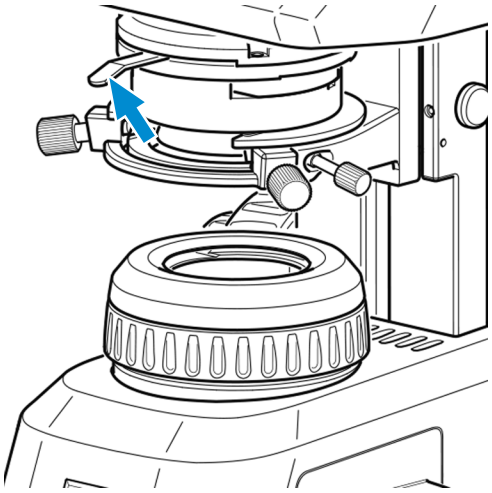
6. Use the rotary knob for illumination intensity to adjust the illumination to a comfortable setting.



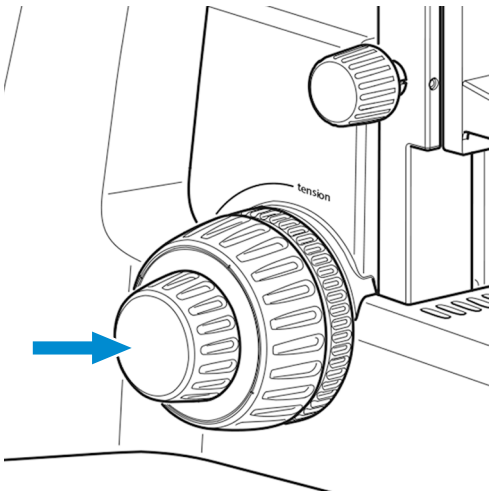
7. Use the knurled knob for vertical condenser adjustment to move the condenser to the upper limit stop.



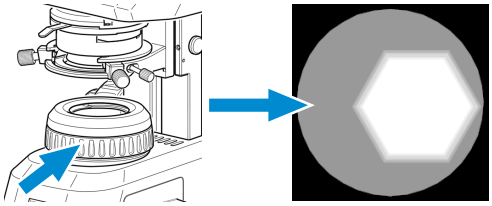
8. Use the control lever of the aperture diaphragm to set the aperture diaphragm to the middle position.



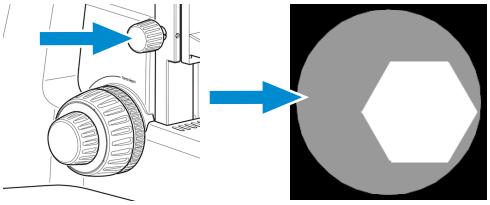
9. Look through one eyepiece and use the focusing drive to bring the specimen into focus.



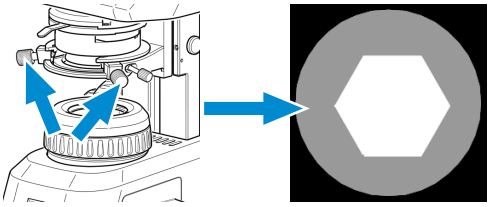
10. If necessary, readjust the image sharpness for the other eye by turning the adjustable eyepiece.
    → The image of the high-contrast specimen is sharp for both eyes.
11. Close the luminous-field diaphragm until its edges become visible in the field of view.



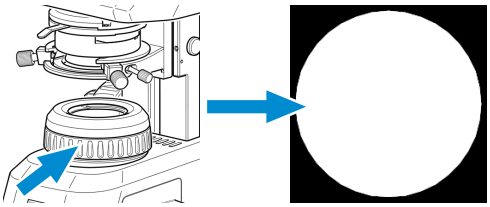
12. Use the knurled knob for vertical adjustment to move the Abbe condenser downwards until the edge of the luminous-field diaphragm becomes sharp.



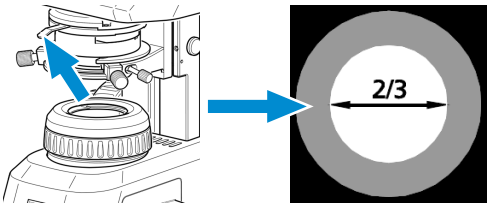
13. Use the centering screws to center the image of the luminous-field diaphragm in the field of view.



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.

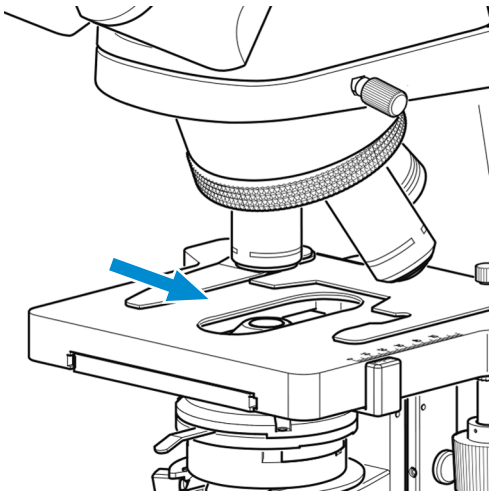
5.5 Adjusting the Transmitted-Light Brightfield on the Fixed-Köhler Microscope

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

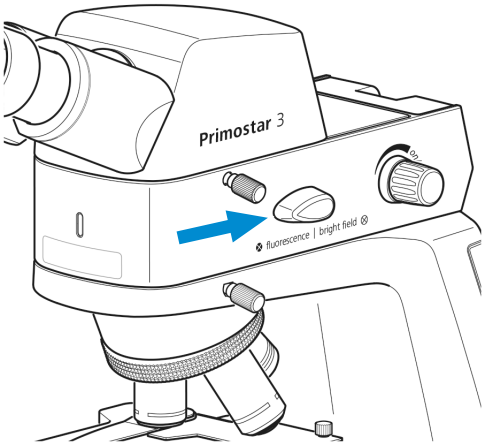
Prerequisite ✓ The microscope is adapted to the user, see *Adjusting the Tube [▸ 67]*.

Procedure

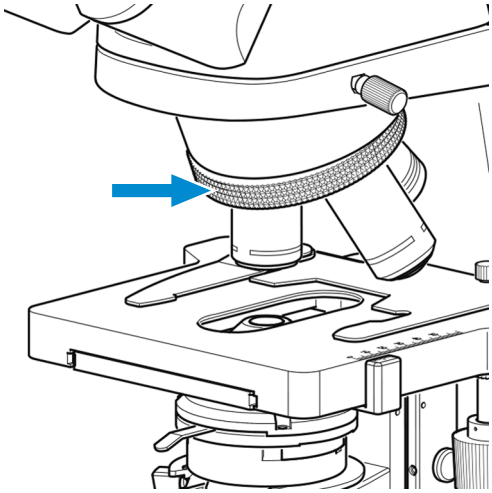
1. Place the specimen in the specimen holder of the mechanical stage.



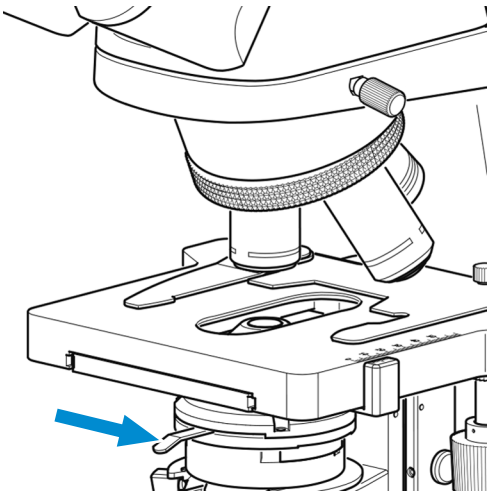
2. If the microscope stand is equipped with a dark-field slider, pull this slider to the left up to the lock-in position.
3. When using the Reflected-light Fluorescence Illuminator iLED, turn the transmitted light/reflected light changeover switch to the transmitted light position **Brightfield** (turn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



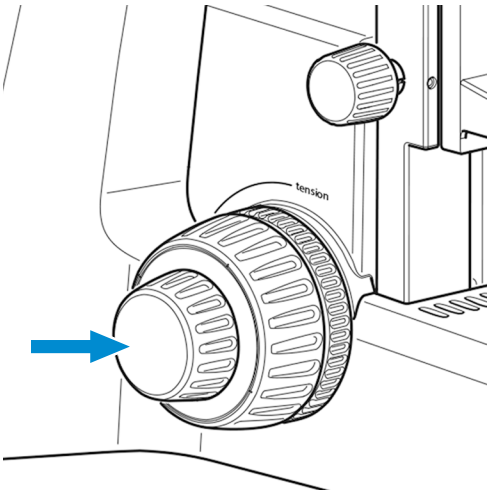
4. Push the slider containing the yellow filter with its filter position into the light path.
5. Adjust to the desired magnification by rotating the corresponding objective into the light path.



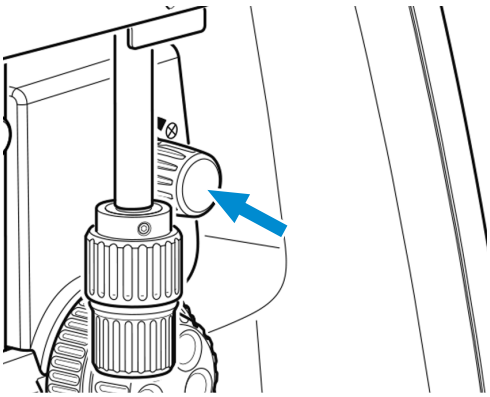
6. Set the control lever of the condenser aperture diaphragm to the value of the selected magnification (**10x**, **40x** or **100x**).



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 reinstall and center it using the two centering screws, see *Installing/Removing the Mirror [▸ 55]*.

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

Parts and Tools

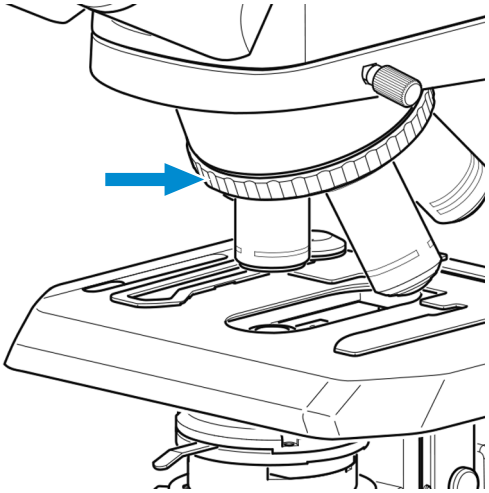
- 2 x Hex key, 1.5 mm

Prerequisite

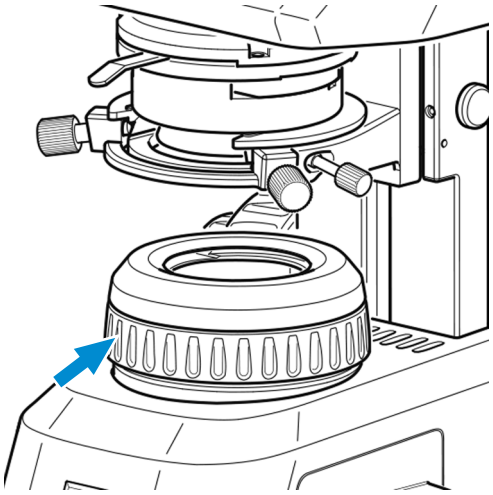
- ✓ The phase contrast method on the microscope requires a stand with Full-Köhler equipment.
- ✓ Contrast slider for phase contrast or darkfield.

Procedure

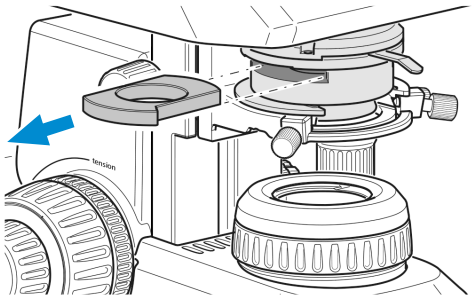
1. Adjust the microscope as you would for transmitted-light brightfield, see *Adjusting the Transmitted-Light Brightfield on the Full-Köhler Microscope [▸ 69]*.
2. Turn the nosepiece to move the phase contrast objective (**Ph 2**) into the light path.



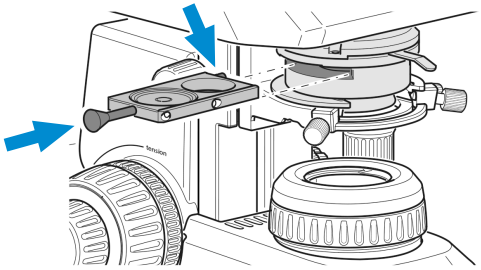
3. Open the luminous-field diaphragm on the stand.



4. Remove the dummy slider from the Abbe condenser.

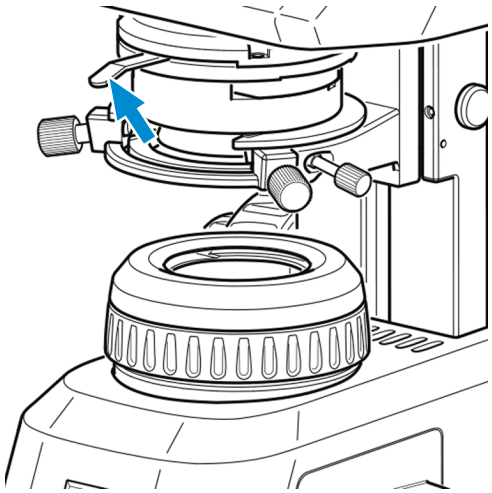


5. Remove the locking screw from the phase contrast slider (fitting the objective used, **Ph 2**). Push the phase contrast slider from the left into the Abbe condenser until it reaches the lock-in position.

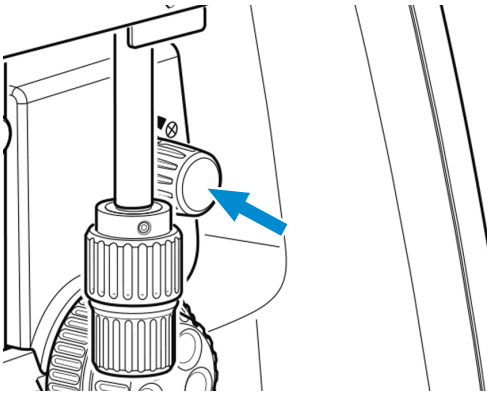


6. Screw the locking screw into the contrast slider.

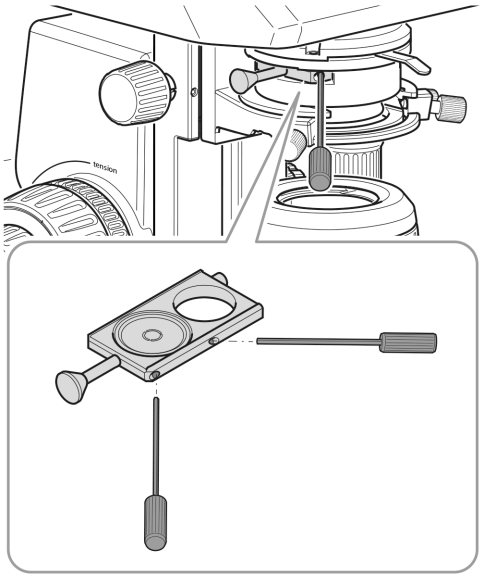
7. Fully open the aperture diaphragm of the Abbe condenser using its control lever (left limit stop).



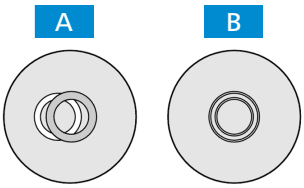
8. Adjust the illumination intensity as required.



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

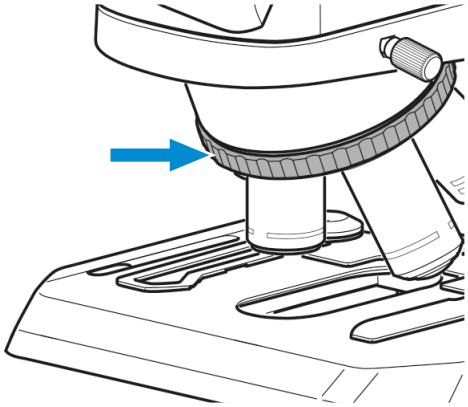
Prerequisite

✓ The phase contrast method on the microscope requires a stand with Full-Köhler equipment..

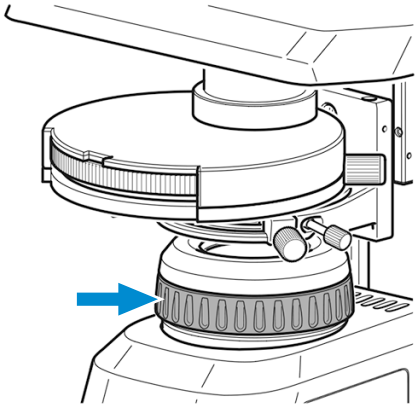
✓ The turret condenser with phase contrast stop or darkfield stop inserted is required.

Procedure

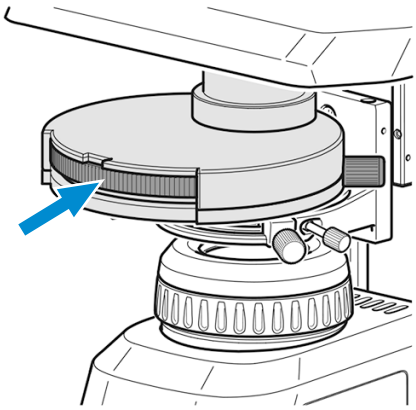
1. Adjust the microscope as you would for transmitted-light brightfield, see *Adjusting the Transmitted-Light Brightfield on the Full-Köhler Microscope [▸ 69]*.
2. Turn the nosepiece to move the phase contrast objective (**Ph 1** or **Ph 2** or **Ph 3**) into the light path.



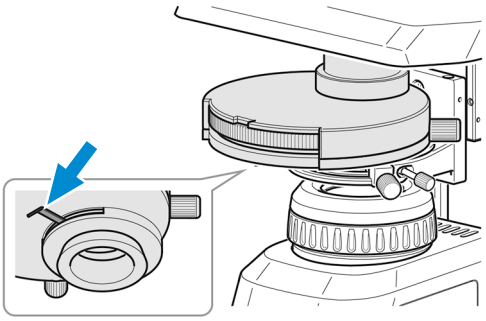
3. Open the luminous-field diaphragm on the stand.



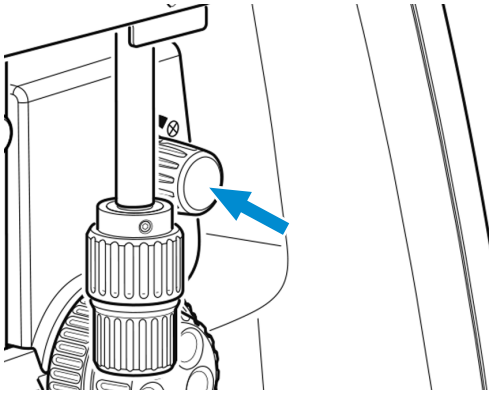
4. Turn the turret disk of the turret condenser to the phase contrast position (**Ph 1** or **Ph 2** or **Ph 3**) that corresponds to the objective being used.



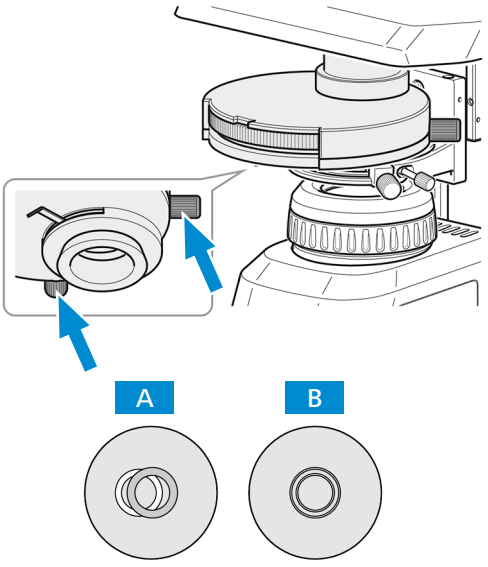
5. Fully open the aperture diaphragm of the turret condenser using its control lever (left limit stop).



6. Adjust the illumination intensity as required.



7. To center the phase stop, remove one eyepiece and replace it with the diopter or telescope.
8. If necessary, center the phase stop from position A to position B by turning the two adjusting screws in the adjustment holes using two Allen wrenches.



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

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

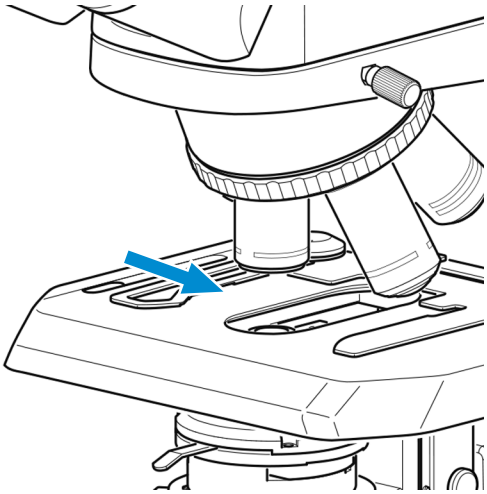
✓ The simple polarization contrast method on the microscope requires a stand with Full-Köhler equipment.

✓ The polarizer plate is inserted into the luminous-field diaphragm in the correct position, see *Installing the Polarizer Plate (Full Köhler Stand) [▸ 49]*.

✓ 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 [▸ 69]*.
2. Place the specimen to be examined under polarized light on the stage and fix it using the spring lever of the specimen holder.



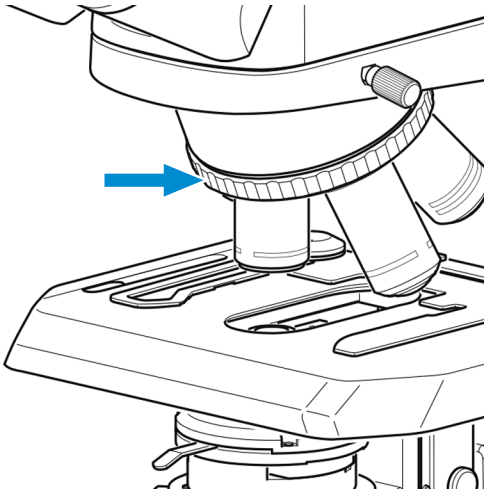
5.9 Adjusting the Reflected-Light Fluorescence

Prerequisite

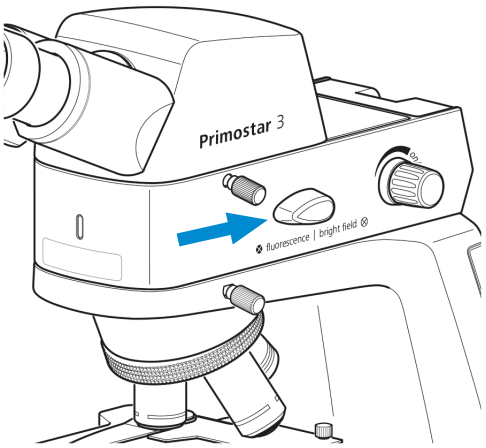
✓ The reflected-light fluorescence method requires the microscope with Reflected-Light Fluorescence Illuminator iLED

Procedure

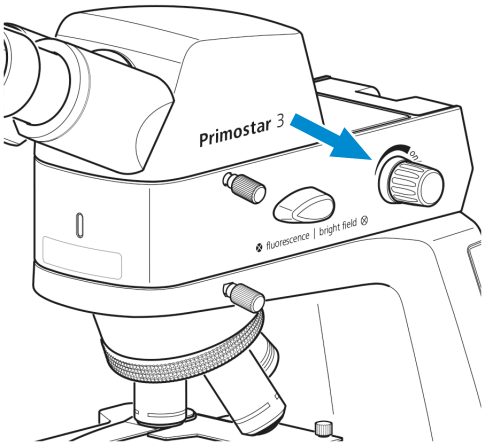
1. Adjust the microscope as you would for transmitted-light brightfield, see *Adjusting the Transmitted-Light Brightfield on the Full-Köhler Microscope [▸ 69]*.
2. Turn the nosepiece to move the objective for fluorescence application into the light path (e.g. objective 40x).



3. Set the transmitted light/reflected light changeover switch to the reflected light position (**Fluorescence**) (first turn it fully upward).

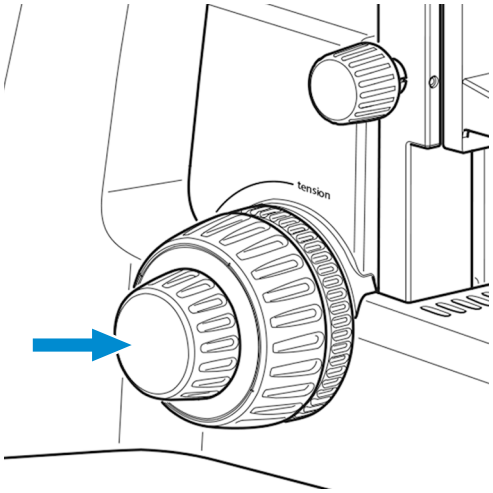


4. Switch on the reflected-light LED using the rotary knob of the reflected-light illuminator and adjust the illumination intensity to a level comfortable for observation.

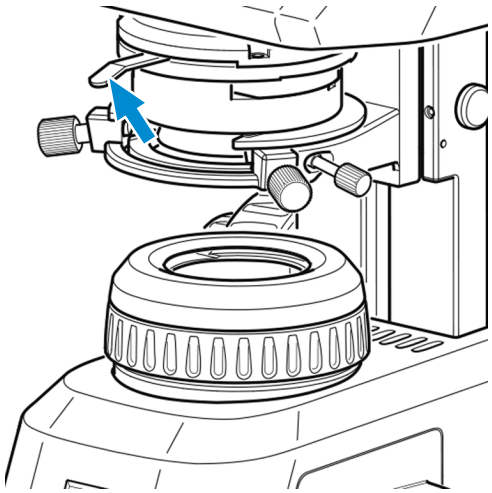


→ The pilot lamp at the front of the reflected-light illuminator is blue. The brightness of the pilot lamp corresponds to the illumination intensity adjusted for reflected light.

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) [▸ 48]*) 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 *Attaching or Removing Yellow Filter or 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.

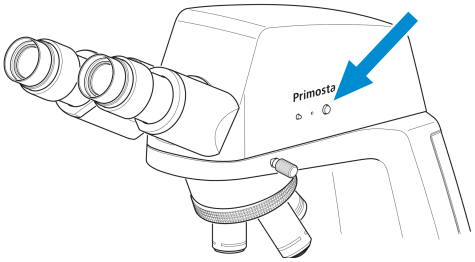
5.10 Capturing Images and Videos Using the Integrated Smart 8 MP Color Camera

5.10.1 Basic Procedure Using Operator Panel

Prerequisite ✓ The USB flash drive has been 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.

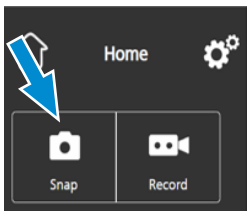
5.10.2 Basic Procedure Using OSD menu

Prerequisite

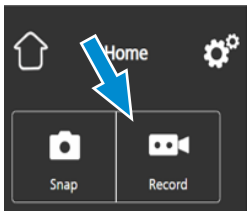
- ✓ The USB flash drive has been inserted into the USB A port.
- ✓ A mouse and keyboard have been plugged into a USB hub, which is connected to the other USB A port.
- ✓ The binocular tube with smart 8 MP color camera is connected to a monitor via HDMI.

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 Image Capture with Labscope or ZEN Lite

Prerequisite

- ✓ Wi-Fi adapter is inserted into the special USB port A; or the binocular tube with smart 8 MP color camera is connected with an Ethernet cable with WLAN. Connection may also be established with a USB 3.0 cable.

Procedure

1. Starting **Labscope** or **ZEN Lite**.
   → When starting **Labscope** or **ZEN Lite** 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.

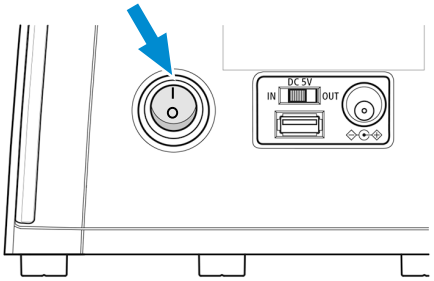
Info

For further support in using **Labscope** or **ZEN Lite**, see www.zeiss.com/microscopy/community. Please check the **Labscope**, **ZEN Lite** threads 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. To maintain operational safety and reliability of the Microscope, we recommend entering into a **ZEISS Protect service agreement**. Please keep the service logs for your Microscope.

Info

Additional information and detailed descriptions are available in the further applicable documents, or ask your ZEISS Sales & Service Partner.

6.1 Safety during Maintenance

Only perform preventive measures as described in the document. All maintenance, service and repair work not described above may only be performed by an authorized ZEISS service technician. Unauthorized interference with the microscope or improper use may result in personal injury or property damage and void any warranty. Only original spare parts from ZEISS may be used.

⚠ DANGER

Voltage

Voltage hazard in case of contact with live parts. Risk of burns and electrocution.

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

6.2 Maintenance Schedule

In order to ensure optimum performance of the microscope, it is essential to perform preventive maintenance at regular intervals. The recommended intervals depend on the duration of use 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 *Replacing the 6 V/30 W Halogen Lamp of the Halogen Module [▸ 86]*.
If required	Batteries of the battery supply unit	Replace the batteries of the battery supply unit, see *Replacing the Batteries of the Battery Supply Unit [▸ 87]*.
If required	Batteries of the battery supply unit	Charge the batteries of the battery supply unit, see *Charging the Batteries of the Battery Supply Unit [▸ 88]*.
If required	Fuse of the battery supply unit	Replace the fuse of the battery supply unit, see Replacing the Fuse of the Battery Supply Unit.

Time Interval	Unit/Component	Activity
If required	Firmware update of the Primostar 3 HD IP camera	Update the firmware of the Primostar 3 HD IP camera, see *Firmware Update of the Primostar 3 HD IP Camera* [▸ 89].

Tab. 8: Maintenance Plan

6.3 Maintenance Work

Only conduct maintenance work described in this document. All pursuing tasks of maintenance, service and repair not described here must only be performed by an authorized ZEISS service representative.

6.3.1 Replacing the 6 V/30 W Halogen Lamp of the Halogen Module

⚠ WARNING

Danger of electric shock

Electric shocks can cause serious injuries or death.

- Before changing the halogen lamp, switch off the device.
- Unplug the microscope from mains power supply.

⚠ CAUTION

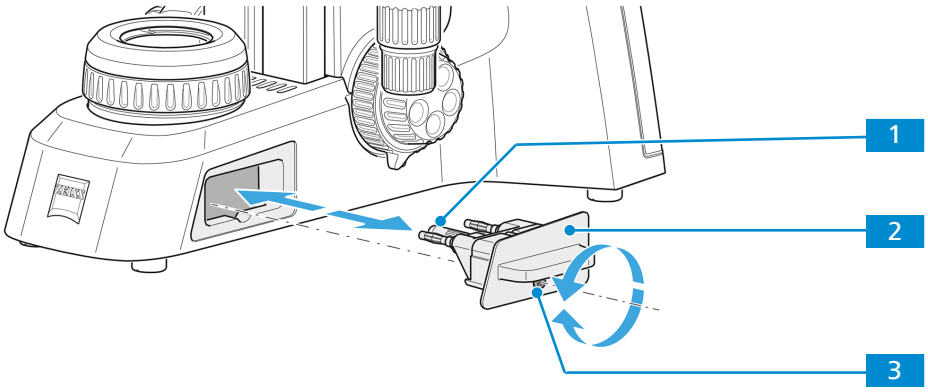
Risk of burns

The halogen lamp emits heat to an extent that can cause moderate or serious injuries.

- Always switch off the device and let the lamp cool down before replacing the lamp.

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 lifespan 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.

6.3.2 Replacing the Batteries of the Battery Supply Unit

⚠ WARNING

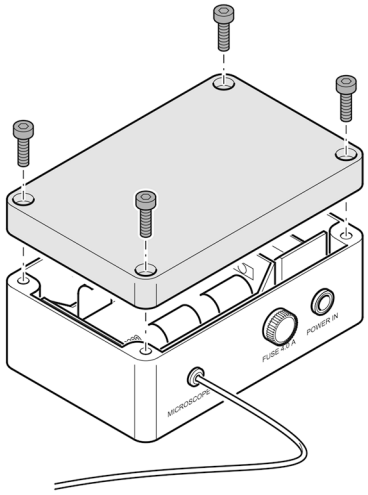
Danger of electric shock

Electric shocks can cause serious injuries or death.

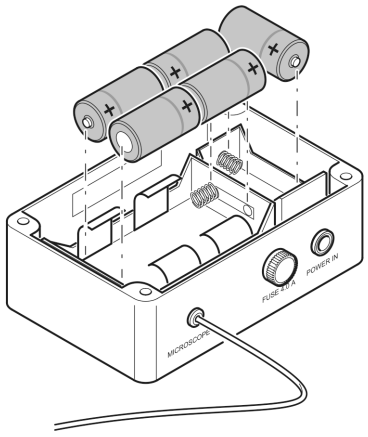
- Before changing the batteries, switch off the device.
- Unplug the microscope from the mains power supply.
- Insert rechargeable batteries only.
- Use only batteries of the same type and capacity as specified, see Technical Data and Conformity.
- Make sure that the battery type switch is in the correct position for the battery type being used.

Procedure

1. Loosen the four slotted screws of the battery supply unit.
2. Remove the lid upward.

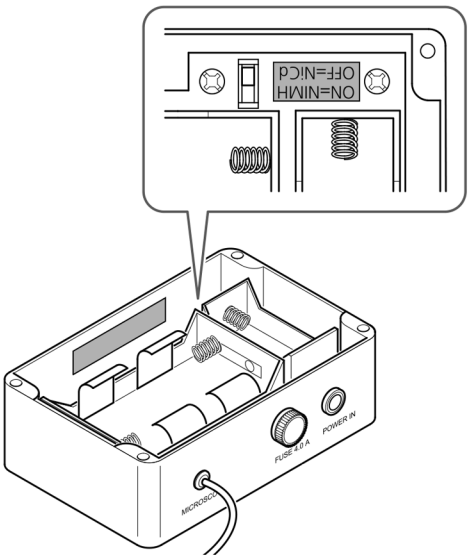


3. Insert five commercial mono-cell batteries (D), type NiCd or NiMH, 1.2 V, with a capacity of 5000 mAh (min.) to 9000 mAh (max.),



4. Pay attention to the correct polarity (see markings in the battery compartments).

5. Push the changeover switch for the battery type to the correct position:
   ON = NiMH;
   OFF = NiCd

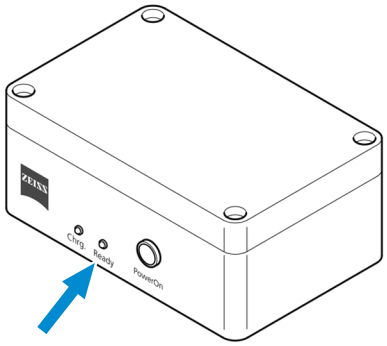


6. Replace the lid.
7. Fasten it with the four slotted screws.

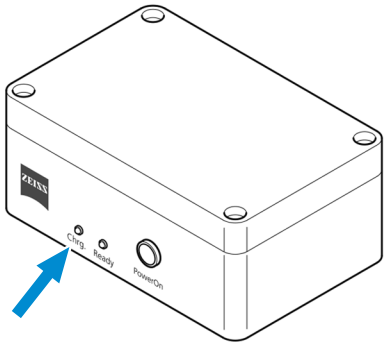
6.3.3 Charging the Batteries of the Battery Supply Unit

Procedure

1. Connect the battery supply unit to the mains power supply using the plug-in power unit.
   → The green power-on light **Ready** is on.



   → The batteries are charged automatically.
   → The yellow charge indicator light **Chrg** will be illuminated for during the entire charging process and will switch off once charging is complete.



2. If required, disconnect the battery supply unit from the mains power supply.

6.3.4 Firmware Update of the Primostar 3 HD IP Camera

Prerequisite
- ✓ The Primostar 3 HD IP camera is connected to a PC or laptop.
- ✓ USB flash drive is available (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 Primostar 3 HD IP camera'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.

6.4 Care and Cleaning Work

⚠ 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 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's 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.

6.4.1 Cleaning the Primostar 3

Auxiliary materials	Quantity
Optics cleaning solution, consisting of 90 vol% gasoline and 10 vol% isopropanol (IPA). Its individual constituents are also known as: Gasoline: Surgical spirit, petroleum ether Isopropanol: 2-propanol, dimethyl carbinol, 2-hydroxypropane	as needed

Tab. 9: Auxiliary materials required for care

Prerequisite
- ✓ Microscope is switched off and disconnected from power supply.

Procedure
1. Cover the instrument with the dust cover after every use.
2. Do not install the microscope in a humid room; maximum humidity is 75 %.
3. Cover open tubes with the dust caps.
4. Remove dust and loose dirt from visible optical surfaces with a brush, blower brush, cotton bud, optics cleaning tissue, or a cotton cloth.

5. Remove water-soluble dirt (beverage stains) by wiping it off with a dust-free cotton cloth or a cloth moistened with water to which you may also add a mild detergent.
6. Wipe off stubborn oily or fatty dirt (immersion oil, fingerprints) with a cotton bud or a dust-free cotton cloth moistened with the optics cleaning solution L.
7. Clean optical surfaces by polishing in circles starting in the middle and moving to the edges using light pressure only.
8. Make sure that no moisture gets into the microscope, the plug-in power unit or the battery supply unit.
9. For use in warm and humid climates, all optical components of the microscope are provided with protection against fungus attack.

6.4.2 Cleaning the Primostar 3 HD IP Camera

Prerequisite ✓ Microscope is switched off and disconnected from power supply.

Procedure
1. The filter glass may only be cleaned with a suitable agent.
2. Remove dust from the filter glass with an optical brush, blower brush, cotton swab, optical paper or lint-free cotton cloth.

7 Troubleshooting

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.
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.

Symptom	Cause	Measure
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 of the microscope with iLED cannot be switched on.	Transmitted light/reflected light changeover switch is in reflected light (**Fluorescence**) position.	Turn transmitted light/reflected light changeover switch to transmitted light (**Brightfield**) position.
Reflected-light illuminator of the microscope with iLED cannot be switched on.	Transmitted light/reflected light changeover switch is in transmitted light (**Brightfield**) position.	Turn transmitted light/reflected light changeover switch to reflected light (**Fluorescence**) position.
	Reflected-light illuminator not sufficiently aligned to microscope stand or displaced, causing interruption of power supply by interlock function.	Align reflected-light illuminator 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: ▪ Hold the specimen holder's two screws. ▪ Unsing the control knob, move the specimen holder to the left and right until it hits the end stop. The stage travel range is reset.

Tab. 10: Troubleshooting on the microscope

7.1 Troubleshooting Primostar 3 HD IP Camera

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.

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 *Primostar 3 HD IP Camera [▸ 27]*.
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 eyepieces	Focus plane of the camera is different from that of the eyepieces	Make sure the sample is focused correctly through eyepieces 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 *Primostar 3 HD IP Camera [▸ 27]*.

Tab. 11: Troubleshooting on the Primostar 3 HD IP camera

7.1.1 Troubleshooting with ZEN Lite Software

Symptom	Cause	Measure
Camera does not appear in the menu for selectable cameras.	The camera is not properly connected.	Check and adjust the USB 3.0 connections to PC and power supply, if necessary.
	The software is not properly installed.	Ensure that the software has been installed with administrative rights and according to the instructions in this manual. Connect the Primostar 3 HD IP camera to the PC with the USB 3.0 cable and re-start the camera.

Tab. 12: Troubleshooting on using the ZEN lite software

8 Transport and Storage

The original packaging must be used for shipping, transport or storage of the individual components of the microscope. To avoid damage due to vibrations, pack all movable components that can be assembled and disassembled separately.

8.1 Important Data for Transport and Storage

Storage in packaging

Parameter	Value
Permissible ambient temperature	-40 to +70 °C
Permissible air humidity (without condensation)	max. 93 % at 40 °C

Transport in packaging

Parameter	Value
Permissible ambient temperature	-40 to +70 °C
Permissible air humidity (without condensation)	max. 93 % at 40 °C

9 Technical Data and Conformity

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

9.1 Applicable Standards and Regulations

Observe the generally applicable local and national safety and accident prevention regulations, as well as the applicable laws and regulations in your country. The microscope has been designed, manufactured and tested in accordance with the following regulations and guidelines:

- The microscopes have been designed, produced and tested in compliance with thefollowing standards:

  - EN / IEC 61010-1
  - EN / IEC 61010-2-101
  - EN / IEC 61326-1
  - EN / IEC 61326-2-6
- The microscopes meet the requirements of the EC Directive 98/79/EC and 2011/65/EU and carry the CE mark. Radio interference suppression in compliance with EN 55011 Class A.
- The instruments must be disposed of in compliance with the WEEE Directive 2012/19/EU.

9.2 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.

Environmental Requirements

Environmental effects such as acoustic noise, floor vibration and room temperature have a significant impact on the performance of the Microscope and the ability to achieve the specified performance with particular regard to long term and sensitive workflows as well as equipment safety.

A site survey can be requested from your local ZEISS service representative prior to the installation.

Location requirements

Installation site	Exclusively inside buildings
Operating range	Max. 2000 m above sea level

Weight and Sizes

Main Components	Length (mm)	Width (mm)	Height (mm)	Weight (kg)
Stand with binocular tube	417	208	395	8.2
Stand with phototube	417	208	395	8.3-9.2*
Stand with Primostar 3 HD IP camera	417	208	395	9.4-10.1*
With tube / phototube turned 180°	306	208	395	
Stand with reflected-light fluorescence illuminator iLED	444	208	471	9.6-11.4*

* Depending on the configuration

Air Conditioning and Quality

Parameter	Value
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 hPa to 1060 hPa
Pollution degree	2

Mains connection

Parameter	Value
Nominal AC voltage	L / N 100 to 240 VAC ± 10 %
Nominal frequency	50 / 60 Hz
Main Power Plug	Local mains plug will be supplied.
Power consumption	max. 100 VA
IP code	IP20 (IEC 60529)
Protection against electrical shock	Class II of IEC 61140
Overvoltage Category	II

EMC Requirements

Parameter	Value
Suppression of interference (without Primostar 3 HD IP camera)	In accordance with EN 55011 Class B
Suppression of interference (with Primostar 3 HD IP camera)	In accordance with EN 55011 Class A

9.3 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.

Halogen lamp

Parameter	Value
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

LED illumination

Feature	Value
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 %

LED in LED modules

Feature	Value
Power consumption	max. 3.5 W
Wavelength	455 / 470 nm

Stand with stage focusing

Feature	Value
Coarse focusing drive	5 mm / rev.
Fine focusing drive	0.5 mm / rev.
Total stage lift	15 mm

Nosepiece

Feature	Value
Objective change	manual via quadruple objective nosepiece
Objectives	infinity-corrected objective range
Mounting thread	W 0.8

Eyepieces

Feature	Value
Tube size	30 mm
Field-of-view number	20 or 22
Magnification	10x
Suitable for spectacle wearers	Br.
Focusable	Foc.

Specimen stage

Feature	Value
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

Condenser

Feature	Value
Abbe condenser 0.9/1.25; Fixed-Köhler	for V_{obj} 4x to 100x
Abbe condenser 0.9/1.25; Full-Köhler	for V_{obj} 4x to 100x
Turret condenser 0.9/1.25; Full-Köhler	for V_{obj} 4x to 100x

Illuminating mirror

Feature	Value
Plane surface and spherical surface with f'	75 mm

Small binocular tube 25°/20

Feature	Value
Maximum field-of-view number	20
Interpupillary distance	adjustable from 48 to 75 mm
Tube angle	25°
Viewing height	380 to 415 mm
Viewing port, tube factor	1x

Small binocular phototube 25°/20

Feature	Value
Maximum field-of-view number	20
Interpupillary distance	adjustable from 48 to 75 mm
Tube angle	25°
Viewing height	380 to 415 mm
Viewing port, tube factor	1x
Photo/video port, tube factor	1x
Photo/video port, mount	60 mm
Invariable splitting ratio	50 vis/50 doc %

Big binocular phototube 25°/22

Feature	Value
Maximum field-of-view number	22
Interpupillary distance	adjustable from 48 to 75 mm
Tube angle	25°
Viewing height	380 to 415 mm
Viewing port, tube factor	1x
Photo/video port, tube factor	1x
Photo/video port, mount	60 mm
Invariable splitting ratio	50 vis/50 doc %

9.4 Performance Data and Specifications of the Primostar 3 HD IP camera

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.

Parameter	Value
Power consumption	12 VDC 1.0 A

Binocular tube 25°/22

Parameter	Value
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

Feature	Value
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.

10 Accessories and Optional Components

10.1 Accessories

The microscope can be equipped with optional components and accessories:

- Modular illumination through 6 V/30 W halogen lamp
- 3 W LED or 1 W LED illumination or illuminating mirror for transmitted-light microscopy
- Optional reflected-light fluorescence illuminator (for Primostar 3 iLED)
- Integrated power unit and country-specific power cable
- Power cable holder fixed at rear-side panel
- 360 degree rotatable small tubes for easy storage
- 5 V USB power port, possible to use mobile power bank to supply power to microscope
- Internal power cable connection between modules, only one main power cable visible
- Plastic-coated (or metal) carrying handle integrated in the stand for setting up, demounting and transporting the device; additional small hand lift option
- Cyan, light-intensity indicators installed on both sides and well visible from a distance
- Encoded feature, light manager, and "sleep" mode
- Stand in "Full-Köhler" or "Fixed-Köhler" design
- Stand with Reflected-light Fluorescence Illuminator iLED in "Fixed-Köhler" design
- "Full-Köhler" or "Fixed-Köhler" Abbe condenser, turret condenser for brightfield, darkfield, polarization, and phase contrast (for "Full-Köhler" design only)
- Convenient coaxial coarse and fine focusing drive, smoothness of coarse focusing drive adjustable
- Mechanical stage with up to two specimen slide holders, stage controls optionally on the right or left
- Space-saving, continuously adjustable illumination module optionally with halogen or LED source
- Backward inclined quadruple or quintuple objective nosepiece with W 0.8 lens thread running on ball bearing
- Infinity corrected iPlan-ACHROMAT objectives with 4x, 10x, 20x, 40x and 100x/oil magnifications for brightfield, darkfield and phase contrast as well as oil immersion applications (100x/oil), 100x dry objective
- Binocular tube or binocular phototube (50 / 50) with ergonomic tube angle of 25° with adjustable interpupillary distance and viewing height
- Primostar 3 HD IP camera and various interfaces and setting options
- 10x adjustable eyepieces for field-of-view numbers 20 or 22, suitable for spectacle wearers

Info

Additional information and detailed descriptions are available in the further applicable documents, or ask your ZEISS Sales & Service Partner.

10.2 Optional Components

The microscope can be equipped with the following optional components:

Objectives for bright field

Component	Cat. No.
Objective iPAcr 4x/0.10	415501-1600-000
Objective iPAcr 10x/0.25	415501-1610-000
Objective iPAcr 20x/0.45	415501-1622-000
Objective iPAcr 40x/0.65	415501-1620-000
Objective iPAcr 100x/0.8 dry	415501-1640-000
Objective iPAcr 100x/1.25 Oil	415501-1641-000

Objectives for bright field without cover glass

Component	Cat. No.
Objective iPAcr 10x/0.25 D=0	415501-1611-000
Objective iPAcr 20x/0.45 D=0	415501-1621-000
Objective iPAcr 40x/0.65 D=0	415501-1631-000
Objective iPAcr 100x/1.25 Oil D=0	415501-1642-000

Objectives and accessories for phase contrast

Component	Cat. No.
Objective iPAcr 10x/0.25 Ph1	415501-1615-000
Objective iPAcr 20x/0.45 Ph2	415501-1625-000
Objective iPAcr 40x/0.65 Ph2	415501-1635-000
Objective iPAcr 100x/1.25 Oil Ph3	415501-1645-000

Required in addition depending on objective

Component	Cat. No./Remark
Slider H/Ph2 f/Primostar 3	415501-1800-000
Slider H/Ph1/Ph2/Ph3	415500-1826-000
Slider DF f/Primostar 3	415500-1802-000

Accessories for Simple Pol

Component	Cat. No.
Polarizer f/Primostar 3	415501-1805-000
Analyzer f/Primostar 3	415501-1806-000

Accessories for darkfield

Component	Cat. No.
Slider DF f/Primostar 3	415500-1802-000

Filter

Component	Cat. No.
Set of color filters blu/grn/yel d45x1.5	415500-1804-000

Accessories for eyepieces

Component	Cat. No.
Pointer for eyepieces foc.	415500-1806-000
Pair of special eyecups	415500-1819-000
Crossline micrometer 10:100 d25	415501-1815-000
Pinhole diaphragm D= 30 mm	444020-0000-000

Eyepieces

Component	Cat. No.
Eyepiece 10x/20 Br. foc.	415501-1500-000
Eyepiece 10x/22 Br. foc.	415501-1501-000

Stands

Component	Cat. No.
Microscope stand, Fix-Koehler rh	415501-1100-000
Microscope stand, Full-Koehler rh	415501-1101-000
Microscope stand, Fix-Koehler rh w/handle	415501-1102-000

Condensers

Component	Cat. No.
Abbe condenser 0.9/1.25	415501-1701-000
Turret condenser with BF/Ph1/Ph2/Ph3/DF	415501-1700-000

Specimen holders

Component	Cat. No.
Specimen holder lh	415501-1304-000
Specimen holder work f/two slides lh	415501-1305-000

External components

Component	Cat. No.
Battery pack	415501-1814-000

Components for iLED

Component	Cat. No.
Reflected-light FL iLED 455 nm	415501-1820-000
Reflected-light FL iLED IDC 455 nm	415501-1821-000
Reflected-light FL iLED 470 nm	415501-1822-000

Illuminators

Component	Cat. No.
Transmitted-light illumination 3W 5600K	415501-1200-000
Transmitted-light illumination 6V/30W	415501-1201-000
Transmitted-light mirror	415500-1202-000

Note: Attachable mirror can only be used with Primostar microscope, fixed-Köhler

Illuminator spare part

Component	Cat. No.
Bulb HAL 6V/30W f/Primostar 3	415500-1901-000

Tubes

Component	Cat. No.
Binocular tube 25°/20	415501-1400-000
Binocular phototube 25°/20 (50.50)	415501-1401-000
Binocular phototube 25°/22 (50.50)	415501-1402-000

Integrated tubes

Component	Cat. No.
Primostar 3 HD IP camera	415501-1403-000

Cameras and accessories

Component	Cat. No.
Axiocam 208 color, with power/signal cable, country-specific plug, 1x USB3.0 cable (Type C to Type A), 1x USB flash drive (Type C to Type A), 1x USB hub, Type C	426570-9000-000
WiFi USB adapter for Labscope connection	426570-9100-000
Binocular tube HD 25°/22 w/int cam 8MPx demo kit (USB B cable, HDMI cable, WIFI dongle, Ethernet cable)	415501-1403-010
Camera adapter P95-C 2/3" 0.65x	415501-1810-000
Camera adapter P95-C 1/2" 0.5x	415501-1811-000

Immersion media and accessories

Component	Cat. No.
Immersion oil Immersol 518 N, oiler 20 ml	000000-1111-806
Immersion oil Immersol 518 N, bottle 100 ml	000000-1111-807
Immersion oil Immersol 518 N,bottle 250 ml	000000-1111-808
Immersion oil Immersol 518 N, bottle 500 ml	000000-1111-809
Box of lens cleaning paper (300 sheets)	462975-0000-000

Dust cover

Component	Cat. No.
Dust cover	415500-1800-000

Case for transport

Component	Cat. No.
Case for transport and storage of Primo Star Dimension: L 430mm x W 280mm x H 500mm	415501-1830-000
Transport+storage case f/Primostar 3	415501-1831-000

Info

Additional information and detailed descriptions are available in the further applicable documents, or ask your ZEISS Sales & Service Partner.

List of Figures

Fig. 1 Positions of labels on the microscope rear side 11
Fig. 2 Position of the label 11
Fig. 3 Positions of labels on the fluorescence unit 12
Fig. 4 Positions of labels on the battery supply unit 12
Fig. 5 Main components of the Fixed-Köhler microscope 16
Fig. 6 Main components of the Fixed-Köhler microscope with iLED 17
Fig. 7 Main components of Fixed-Köhler microscope with Primostar 3 HD IP camera 18
Fig. 8 Main components of the Full-Köhler microscope 19
Fig. 9 Stand controls on the right side 20
Fig. 10 Stand controls on the left side 21
Fig. 11 Stand controls and connections on the rear side 22
Fig. 12 Stand controls on the right side 23
Fig. 13 Stand controls on the left side 24
Fig. 14 Stand controls and connections on the rear side 25
Fig. 15 Controls of the reflected-light fluorescence illuminator 26
Fig. 16 Connections and special components on the rear side of the reflected-light fluorescence illuminator 27
Fig. 17 Controls of the Primostar 3 HD IP camera 27
Fig. 18 Cover plate (for covering the USB TYPE A port and the RJ12 port) of the Primostar 3 HD IP camera on the rear side 28
Fig. 19 Connections and special components of the Primostar 3 HD IP camera on the rear side 28
Fig. 20 Controls, indicator lights and connection on the battery supply unit 29
Fig. 21 Abbe condenser and turret condenser 30
Fig. 22 Eyepiece 31
Fig. 23 Storage places 31
Fig. 24 Home menu, control elements 35
Fig. 25 Settings menu, control elements 37
Fig. 26 Image Settings menu, control elements 38
Fig. 27 Microscope system menu, control elements 39
Fig. 28 Operating System menu, control elements 40
Fig. 29 File Options menu, control elements 41
Fig. 30 Connecting the microscope to the mains power supply 58
Fig. 31 Connecting the microscope to the battery supply unit 58
Fig. 32 Connecting the microscope to a power bank 59

List of Tables

Tab. 1 Text convention 6
Tab. 2 Link types 6
Tab. 3 List of attached warning and information labels 12
Tab. 4 System status/operating mode of the Primostar 3 HD IP camera shown by LED indicator 28
Tab. 5 Connecting cables and accessories 32
Tab. 6 Obligatory label components 33
Tab. 7 Further label components 34
Tab. 8 Maintenance Plan 85
Tab. 9 Auxiliary materials required for care 89
Tab. 10 Troubleshooting on the microscope 91
Tab. 11 Troubleshooting on the Primostar 3 HD IP camera 93
Tab. 12 Troubleshooting on using the ZEN lite software 95

Glossary

HDMI

High Definition Multimedia Interface

LED

Light emitting diode

OSD

On Screen Display

TL

Transmitted Light, designation for microscopy techniques to image light that is transmitted through the object

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.

USB

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

User

Person examining a sample under the microscope.

Wi-Fi

Wireless Fidelity

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.

ZEISS Sales & Service Partner

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

ZEISS service representative

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

Index

A

Accessories 33, 103, 104
Adjusting the tube 67
Air Conditioning and Quality 98
Analyzer plate 49

B

Battery
  Charging 88
  Replacing 87
Battery supply unit 29, 66
Brightfield 69, 73

C

Camera 52
Capturing
  Images 82, 83
  Videos 82, 83
Care 89, 90
Charging batteries 88
Cleaning 89, 90
Comissioning 65
Components 104
  Primostar 3 (Fixed-Köhler) 16
  Primostar 3 (Fixed-Köhler) with Primostar 3 HD IP camera 18
  Primostar 3 (Full-Köhler) 19
  Primostar 3 iLED (Fixed-Köhler) 17
Condenser 54
Connecting the microscope 58, 59
Connecting the Primostar 3 HD IP camera 60, 61, 62, 63
Connecting to the PC 60
Connections
  Battery supply unit 29
  Fixed-Köhler stand 22
  Full-Köhler stand 25
  Primostar 3 HD IP camera 28
  Reflected-light fluorescence illuminator 27
Controls
  Battery supply unit 29
  Fixed-Köhler stand 20
  Full-Köhler stand 24
  Primostar 3 HD IP camera 27
  Reflected-light fluorescence illuminator 26

D

Darkfield 75, 78

E

EMC requirements 98
Ethernet 62
Eyecup 57
Eyepiece 31
Eyepiece micrometer 68
Eyepiece pointer 55, 68

F

File Options menu 41
Filter 47, 48
Firmware 89
Fixed-Köhler stand 21
Fluorescence 80
Fluorescence illuminator 103
Focusing ring of the eyepiece 69
Full-Köhler Stand 25

H

Halogen lamp 86
Hazards 10
  Prevention 10
Home menu 35

I

Illuminating mirror 103
Illumination
  Fluorescence 103
  Halogen lamp 103
  LED 103
Image 82, 83
Image Settings menu 38
Information labels 11, 12
Installation 42
Installing
  Analyzer plate 49
  Camera 52
  Condenser 54
  Eyepiece pointer 55
  Filter 47, 48
  Micrometer 55
  Mirror 55
  Objective 53
  Polarizer plate 49
  Primostar 3 HD IP camera 50
  Reflected-light fluorescence illuminator iLED 44
  Software 64
  Tube 43
Intended use 9
Interpupillary distance 67

L

Labscope 64, 83
LED illumination 103
Location requirements 97

M

Mains connection 98
Maintenance 85
  Interval 85
  Plan 85
  work 86
Micrometer 55
Microscope System menu 39
Mirror 55

N

Network 61

O

Objective 33, 53
Operating System menu 40
Operation 65
OSD 35, 37, 38, 39, 40, 41, 83

P

Performance data 97
Phase contrast 75, 78
Polarization 80
Polarizer plate 49
Power bank 67
Primostar 3 HD IP camera 27, 35, 50

R

Reflected-light fluorescence 80
Reflected-light fluorescence illuminator 26, 44
Regulations 97
Replacing
  Batteries 87
  Halogen lamp 86
Requirements for users 10

S

Safe Operating Condition 9
Safety 9
  devices 13, 14
  General 9
  interlocks 13
Settings menu 37
Software 7, 64
Standards 97
Storage 96
Switching off 84
Switching on 65, 66, 67

T

Tool storage 31
Training 10
Transmitted-light brightfield 69, 73
Transmitted-light darkfield 75, 78
Transmitted-light phase contrast 75, 78
Transmitted-light polarization 80
Transport 96
Troubleshooting 92, 94, 95
Tube 43

U

Update firmware 89

V

Video 82, 83
Viewing height 68

W

Warning labels 11, 12, 13
Weight and Sizes 98
Wi-Fi adapter 63
Wi-Fi Settings menu 41

Z

ZEISS
  Service agreements 85
ZEN lite 64, 83

Instruction Manual ZEISS Primostar 3 | en-US | Rev. 1
Modifications reserved. | Printed in Germany

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

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

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