Instruction Manual

ZEISS Axio Observer 3, Axio Observer 5, Axio Observer 7

Inverted Microscopes

ZEISS Axio Observer 3, Axio Observer 5, Axio Observer 7

Original Manual

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1 Contact and Addresses

ZEISS Contact

Find your contact at ZEISS Microscopy at www.zeiss.com/microscopy/contact.

ZEISS Academy

For information on microscopy courses, training, and education visit the ZEISS Academy Microscopy at www.zeiss.com/microscopy-training.

Legal Manufacturer

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

Authorized Representatives, Importers, etc.

This section informs about responsible entities for certain obligations in the identified country or jurisdiction.

EU

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

UK Importer

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

2 About this Instruction Manual

This Instruction Manual (further called "document") is considered to be part of the Axio Observer 3, Axio Observer 5, Axio Observer 7, herein after referred to as "microscope".

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

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

2.1 Text Conventions and Link Types

Explanation	Example
Software controls and GUI elements.	Click **Start**.
Hardware controls and elements.	Press the **Standby** button.
Key on the keyboard.	Press **Enter** on the keyboard.
Press several keys on the keyboard simultaneously.	Press **Ctrl + Alt + Del**.
Follow a path in the software.	Select **Tools > Goto Control Panel > Airlock**.
Text to be entered by the user.	Enter *example.pdf* in this field.
Anything typed in literally during programming, for example macro codes and keywords.	Enter `Integer` in the console.
Link to further information within this document.	See: *Text Conventions and Link Types [▶ 9]*.
Link to a website.	https://www.zeiss.com

2.2 Explanation of Warning Messages and Additional Information

DANGER, WARNING, CAUTION, and NOTICE are standard signal words used to determine the levels of hazards and risks of personal injury and property damage.

Always observe the safety and warning messages in **all** chapters of this document. Failure to comply with these instructions and warnings may result in personal injury, property damage, and the loss of any claims for damages.

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

Signal Word	Explanation
DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.
CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Signal Word	Explanation
NOTICE	*NOTICE* indicates a potentially harmful situation which, if not avoided, may result in property damage.
Info	Provides additional information or explanations to help the user better understand the contents of this document.

Tab. 1: Warning Massages and Additional Information

2.3 Explanation of Symbols

	TÜV SÜD certification mark: product certified by TÜV SÜD to meet U.S. and Canadian standards.
	CE marking (Conformité Européenne)
	UKCA marking (UK conformity assessed)
	Manufacturer
	Date of manufacture
	Serial number
	Catalogue number
	WEEE label: Do not discard as unsorted waste. Send to separate collection facilities for recovery and recycling
	EFUP (Environmentally Friendly Use Period) of 50 years. According to the China RoHS regulation, it refers to the period during which the hazardous substances contained in an electronic or electrical product do not leak or mutate suddenly under normal operating conditions and will not result in serious environmental pollution or cause serious damage to the user's body or their assets during normal use.

2.4 Further applicable Documents

Brochures and Certificates For brochures, declarations of conformity, and other approval certificates ask your ZEISS Sales & Service Partner.

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

Local and National Health and Safety Regulations Observe local and national health and safety regulations for the location of installation and during the use of the microscope.

Consult with your ZEISS Sales & Service Partner if these regulations are in conflict with the installation requirements of the microscope.

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

Software For detailed information on how to use the software, refer to its manual (e.g. Online Help, Software Manual) or ask your ZEISS Sales & Service Partner.

System and Third-Party Components, Accessories Information about the individual components, enhancements, and accessories can be obtained from your ZEISS Sales & Service Partner. Also refer to the documentation of third-party manufacturers.

Instruction Manuals Also observe the following instruction manuals depending of your system configuration:

- Light sources and illumination units (e.g. HAL 100, X-Cite XYLIS II®, Viluma 5/7)
- Definite Focus 3
- AI Sample Finder
- Apotome 3
- Incubation system
- LSM system
- Cameras (e.g. Axiocam, SLR)
- Filter wheels
- Additional accessories and components of the microscope

Many of these instruction manuals can be found in the ZEISS Portal.

3 Safety

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

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

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

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

- the competent authority of the Member State in which the user is established
- Carl Zeiss Microscopy GmbH, Jena, Germany

3.1 Intended Purpose

Axio Observer 3/5/7

The Axio Observer 3/5/7 microscopes are inverted light microscopes and are intended for use as general lab microscopes for research and routine examinations of biological samples. It is not intended to either directly or indirectly generate medical diagnostic results.

In its configuration for various applications the microscope is primarily used for examining cell and tissue cultures and sediments in culture flasks, Petri dishes and microtiter plates under transmitted and reflected light.

Typical applications

- examination of blood and tissue samples taken from the human body, from plants, or animals
- observation of intracellular processes in living cell cultures, cell-to-cell interactions, motility, growth
- measurement of potentials, drug detection
- Microinjection
- patch-clamp techniques, ion measurements
- Toxicity studies
- digital recordings, time lapse studies with automated processes
- Z-sectioning, deconvolution, visualization of molecular structures
- calcium measurement using Fura, GFP imaging
- application of optical tweezers and scissors
- single molecule detection

Axio Observer 3/5/7 materials

The inverted microscopes Axio Observer 3/5/7 materials are intended as general-purpose microscopes for applications including materials examination. It is not intended to either directly or indirectly generate medical diagnostic results.

In its configuration for material studies the microscope is used in all areas of research-based and industrial microscopy. It permits the unrestricted use of conventional samples as a result of the highly accommodating sample compartment and facilitates the examination of samples of large dimensions.

Typical fields of applications

- the inspection of material samples and components, such as component surface parameters, coating thicknesses etc.
- the identification of microstructure types, such as the study of heat-affected zones around welded joints
- the assessment of the composition and structure of materials, e.g. for failure cause analysis or quality control
- various investigations of composite materials and material compounds, including those made from renewable resources or combinations of organic and inorganic substances (e.g. epidermis cells on prosthesis or implant materials).

3.2 General Safety Information

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

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

3.2.1 Requirements for Operators

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

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

Training

Authorized ZEISS personnel will provide basic training in operating the microscope, as well as information on equipment safety and maintenance work that can be conducted by the operator. The training will be documented by ZEISS and its completion is to be confirmed by the operator.

Special application training is offered for a fee. Current training dates, additional information and the registration form can be found at www.zeiss.com or at the ZEISS Portal.

3.2.2 Safe Operating Condition

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

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

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

3.2.3 Order and Use of Spare Parts

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

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

3.2.4 EMC Information

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

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

External interferences such as electrostatic discharge can interrupt the function of the illumination units X-Cite XYLIS II® and Viluma 9. This is not a defect. Correct function can be restored by restarting the illumination unit. There is no damage to the illumination unit. In this case it may help to remove the source of interference from the vicinity of the illumination unit.

External interferences such as conducted disturbances induced by RF fields, surges, or electrical fast transients (bursts) can interrupt the function of the X-Cite XYLIS II® illumination unit. This is not a defect. Correct function can be restored by restarting the illumination unit. There is no damage to the illumination unit. In the case of conducted disturbances induced by RF fields, it may be helpful to remove the interference source from the immediate vicinity of the light source. In the case of conducted disturbances induced by surges or electrical fast transients (bursts), transient protection is a possible protective measure.

The following EMC user notice is for Korea only:

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

3.2.5 Optical Risk Grouping

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

Risk group	Description
Exempt	No photobiological hazard.
1 (low risk)	No hazard due to normal behavioral limitations on exposure.
2 (moderate risk)	No hazard due to the aversion response to very bright light sources or thermal discomfort.
3 (high risk)	Hazardous even for momentary exposure.

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

Light source	Risk group
Viluma 9	3
Viluma 5/7	3
X-Cite XYLIS II®	3
HXP 120 V	2
HBO 100	2
HBO 50	2
microLED 3	2
VIS-LED 2	2
HAL 100	1

3.3 Prevention of Hazards

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

3.3.1 Mechanical Hazards

Crushing Hazards due to Motorized Components

The microscope contains motorized components. Fingers could be trapped. Do not reach into the working area of motorized components when they are in operation.

Property Damage due to Transport

There is a risk of injury and property damage if the microscope is improperly handled and transported.

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

3.3.2 Hazards Generated by Radiation

Optical Radiation Hazards

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

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

3.3.3 Electrical Hazards

Voltage Hazards

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

- Detachable mains supply cords must not be replaced with inadequately rated cords.
- Disconnect all power cords before cleaning.
- Only connect electrical systems that are authorized by ZEISS to the supplied power supply cord.
- Set up and operate the microscope so that the connectors are easily accessible.
- Position the microscope in a way so that you can easily unplug the power cord at any time.
- The microscope must be plugged into a properly installed power socket with protective earth contact using the supplied mains cords. The protective earth connection must not be impaired by the use of extension cables.
- Always use the power cords supplied by ZEISS. When an unsuitable power cord is used, ZEISS can no longer guarantee the electrical safety and functionality of the microscope.
- Shut down the microscope when not using the microscope.
- Safe disconnection from the power supply is only ensured by pulling out the power cord. The switch on the microscope only switches to standby mode.

3.3.4 Hazards Generated by Materials and Substances

Infection Hazards

Direct contact with the eyepieces can be a potential way of passing on bacterial and viral infections.

- The risk can be lowered by using personal eyepieces or eyecups. If eyepieces need to be disinfected frequently, ZEISS recommends to use the eyepieces without eyecups.
- To avoid infections, the use of personal protective equipment (PPE), e.g. gloves, for operation, cleaning, and decontamination is highly recommended. Disposable gloves can be decontaminated with alcohol for example, if necessary, or should be changed frequently to minimize the risk of contamination.

Biological Hazard

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

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

Consumable Hazards

Incorrect handling of consumables and cleaning agents can lead to property damage or skin and eye injuries. Consumables that are not approved by ZEISS can lead to property damage. Consult your ZEISS Sales & Service Partner to learn what consumables you can order and how to handle them.

Immersion Oil Ensure that no immersion oil enters the surface water or the sewage system. The immersion oil can cause skin irritation.

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

Hazardous Substances The microscope and other components can come into contact with various samples and substances that can be hazardous to humans and the environment. 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.

- Make sure that the microscope and its components was not in contact with hazardous substances (check the laboratory logbook); otherwise, the microscope and its components must be cleaned/decontaminated/disinfected.
- Label contaminated/infected components that cannot be properly cleaned.
- Direct contact with the eyepieces (if applicable) can be a potential way of passing on bacterial and viral infections. The risk can be lowered by using personal eyepieces or eyecups. If eyepieces need to be disinfected frequently, ZEISS recommends to use eyepieces with eyeglass protection rings instead of foldable eyepieces.
- Contaminated parts shall not be returned to any ZEISS department. Decontaminated parts can be sent to ZEISS accompanied by a signed „Customer Declaration of Decontamination".
- Wear personal protective equipment if necessary.

3.3.5 Hazards Generated with the Operating Environment

Explosive Hazard Fire hazard due to explosive or flammable environment.

Do not operate the microscope and its components in a potentially explosive atmosphere, in the presence of volatile anesthetics or flammable solvents such as alcohol, petrol, or similar substances.

Dirt, Dust, and Moisture Dirt, dust, and moisture can impair the microscope's functionality.

- Shut down the microscope whenever it is not used and cover it with a dust protection cover (if available).
- Always cover unused openings/ports with the corresponding system component or with blind caps.
- Perform regular maintenance and cleaning according to the instructions in this manual.
- Make sure that no cleaning liquid or moisture gets inside the microscope.
- Make sure that the electrical parts never come into contact with moisture.
- Never expose the microscope to inadmissible climate conditions (high humidity and temperature).

3.3.6 Ergonomic Hazards

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

3.3.7 Thermal Hazards

Burning Hazards Hot surfaces, radiation and/or aggressive chemicals can cause burns.

- Use suitable protective equipment / protective clothing if mandatory.
- Always observe the cooling time of the hot surfaces.

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

- Keep ventilation openings unobstructed at all times.
- Do not cover devices or openings emitting heat.
- Do not obstruct ventilation.
- Comply with minimum distance from walls. The distance of the system to the wall should be at least 15 cm, in order to ensure sufficient air circulation and accessibility of the cabling.

3.4 Labels and Lights

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

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

Always observe **all** warning labels!

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

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

3.4.1 Labels on the Axio Observer

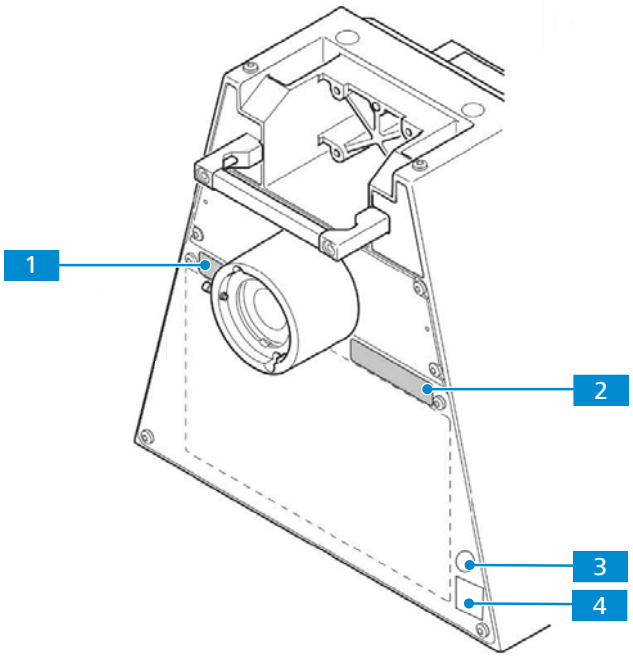


Fig. 1: Labels on the rear side of the Axio Observer

Pos.	Label or light	Explanation
1	Carl Zeiss Microscopy GmbH Carl-Zeiss-Promenade 10, 07745 Jena, Germany S/N.:	Type label

Pos.	Label or light	Explanation
2		Type label
3		Pull the power plug before opening.
4		TÜV SÜD certification mark

4 Product and Functional Description

The Axio Observer is equipped with various main components, control elements and interfaces. These are partly dependent on the model type.

4.1 Main Components: Axio Observer

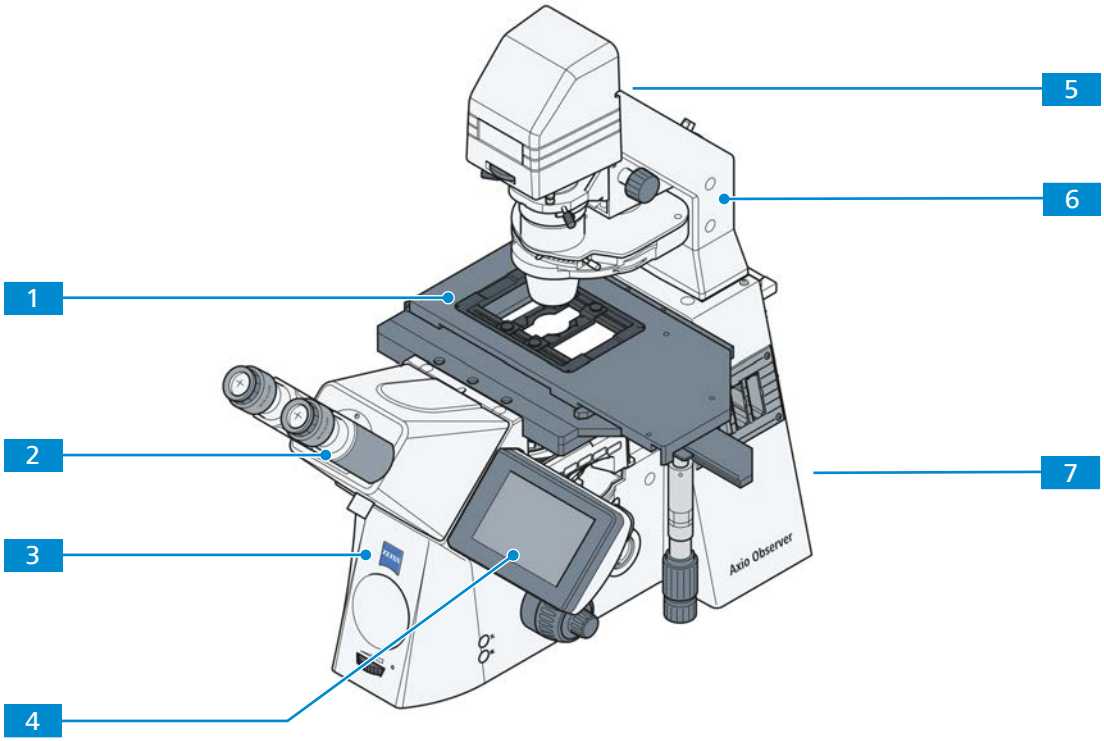


Fig. 2: Main components of Axio Observer

1	*Microscope stage with insert plate [▸ 45]*	2	*Tube with eyepieces [▸ 33]*
3	Stand	4	*TFT display [▸ 137]**
5	Port for TL (Transmitted light) light source	6	*Carrier for transmitted light illumination [▸ 24]*
7	Port for RL (Reflected Light) light source		

*only with Axio Observer 7

4.2 Main Components: Axio Observer materials

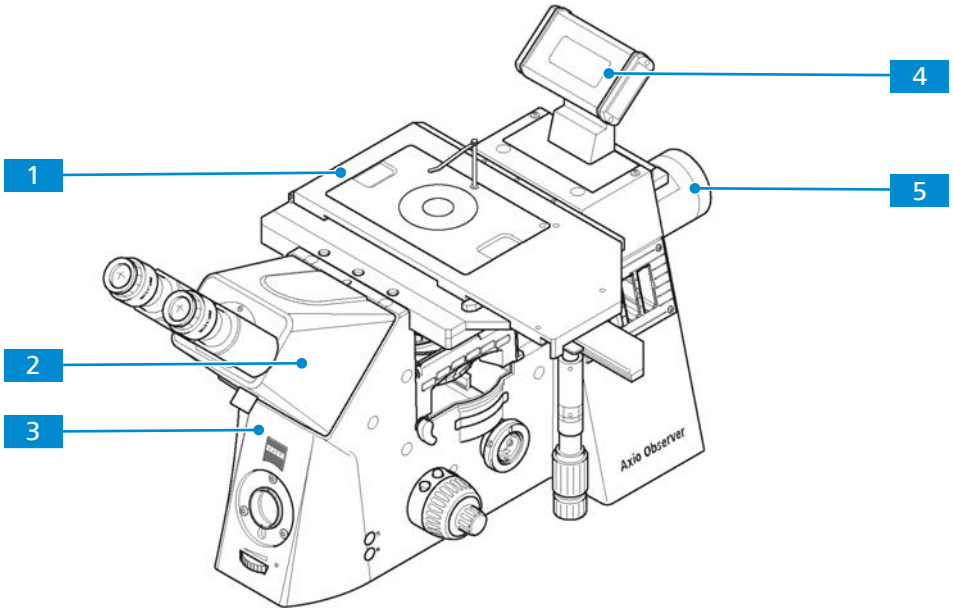


Fig. 3: Main components of Axio Observer materials

1	*Microscope stage with insert plate [▸ 45]*	2	*Tube and Eyepieces [▸ 33]*
3	Stand	4	*Holder with LCD [▸ 27]**
5	RL (Reflected Light) light source		

*only with Axio Observer 5 materials

4.3 Controls and Functional Elements on the Stand

The controls and functional elements of the base stand for all Axio Observer stands are similar. These may vary depending on the configurations.

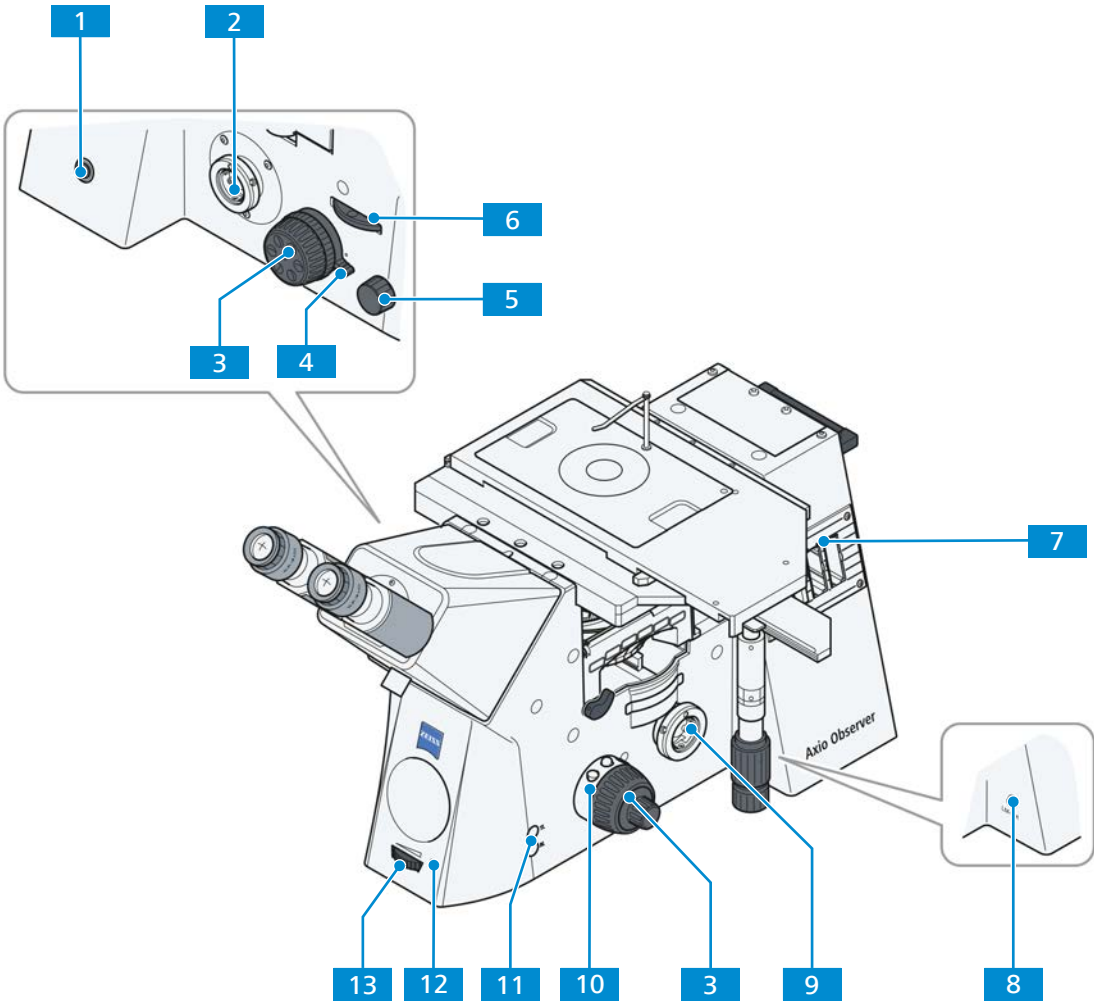


Fig. 4: Controls and functional elements on the stand

No.	Name	Function
1	STANDBY button	Switch the microscope on and off.
2	Left sideport	Port for connecting documentation equipment (e.g. camera). Various splitting ratios for left sideport and visual observation (vis), depending on the configuration.
3	Focusing knob	*Fine and coarse adjustment of the focus [▸ 77].*
4	*Vertical stop for focusing knob [▸ 73]*	Limit the upper position of the focusing knob.
5	Beam path selector wheel (baseport / vis / frontport)	*Split the output beam path [▸ 76].*
6	Beam path selector wheel (left / right sideport / vis)	*Split the output beam path [▸ 76].*

No.	Name	Function
7	Slots for *sliders [▸ 136]*	Sliders are mechanical parts that can receive one or more optical components, such as filters, polarizers, etc., which are set into the beam path.
8	**LM-Set** button	Different functions, e.g. start the *configuration mode [▸ 72]*, setting objectives, setting the *Light Manager [▸ 67]*
9	Right sideport	Port for connecting documentation equipment (e.g. camera). Various splitting ratios for left sideport and visual observation (vis), depending on the configuration.
10	*Control ring [▸ 23]*	Control motorized components or illumination settings.
11	**RL** and **TL** button	**TL** button: Switching the transmitted light on and off or open and close the transmitted light shutter. **RL** button: Switching the reflected light on and off or open and close the reflected light shutter. **TL** (next) or **RL** (previous) button to switch between the submenues in the *configuration mode [▸ 72]*.*
12	Power LED	Lights up when the microscope is switched on.
13	Illumination intensity control wheel	*Adjust the brightness of the illumination unit [▸ 65]*.

* only with Axio Observer 5

4.3.1 Control Ring

Components or light sources can be controlled with the two pairs of buttons and one single button on the control ring.

Position The control ring is located on the right side of the stand.

The factory set default button configuration is shown on the adhesive label affixed to the stand. If the button allocation is changed, the adhesive label affixed to the stand should be updated using the additional adhesive labels supplied.

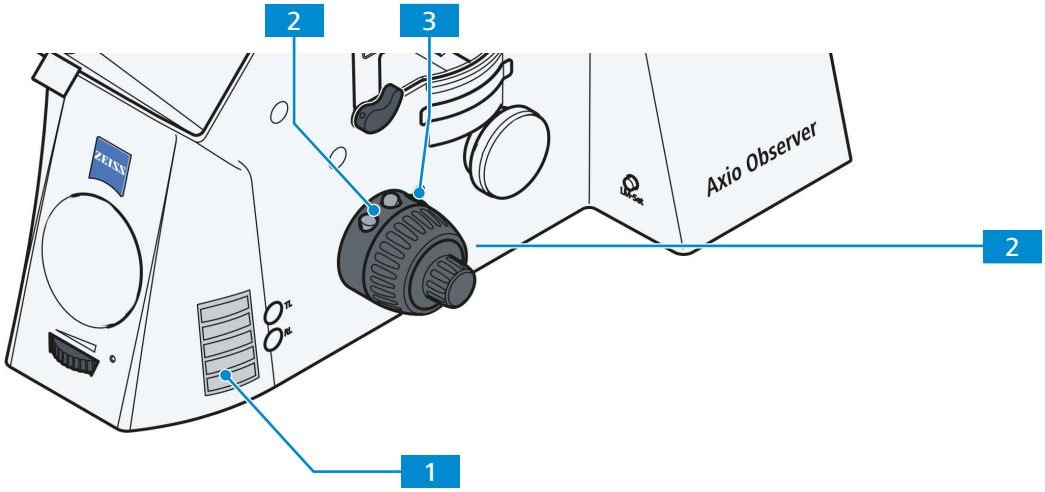


Fig. 5: Control ring

1	Adhesive label	2	Pair of buttons
3	Single button		

4.4 Controls and Functional Elements on the Carrier for Transmitted Light

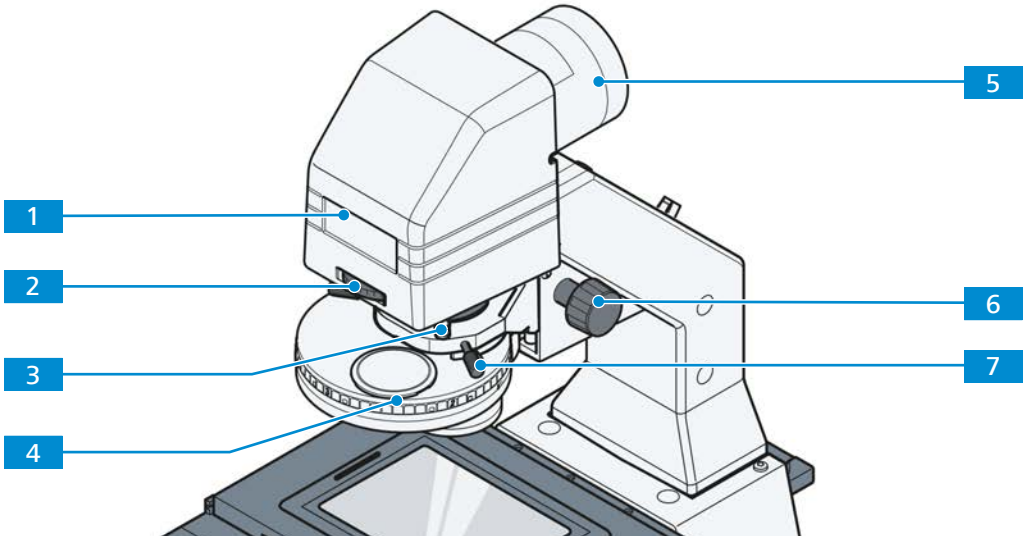


Fig. 6: Controls and functional elements on the carrier for transmitted light illumination

No.	Name	Function
1	LCD display	Display information about e.g. objective, overall magnification or lamp voltage.
2	TL luminous-field diaphragm control	Adjust the size of the luminous-field diaphragm diameter. ▪ Turn right to close. ▪ Turn left to open.
3	Polarizer for TL	Insert polarization or filter elements into the beam path.
4	*Condenser [▸ 41]*	Adjust the illumination path.
5	*Light source [▸ 59]*	Illuminates the sample.
6	Condenser height control	Adjust the condenser height.
7	Condenser centering screw (2x)	Center the condenser.

4.4.1 Assembling the Transmitted Light Illumination Carrier

Info

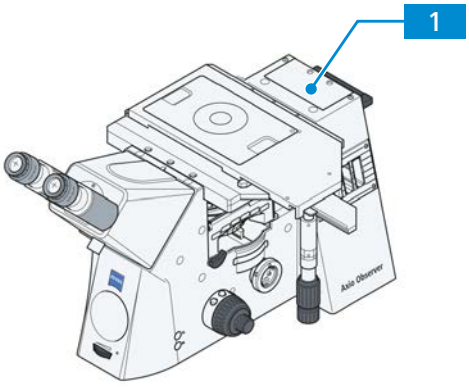
If necessary, this should only be performed by an authorized ZEISS representative.

Parts and Tools

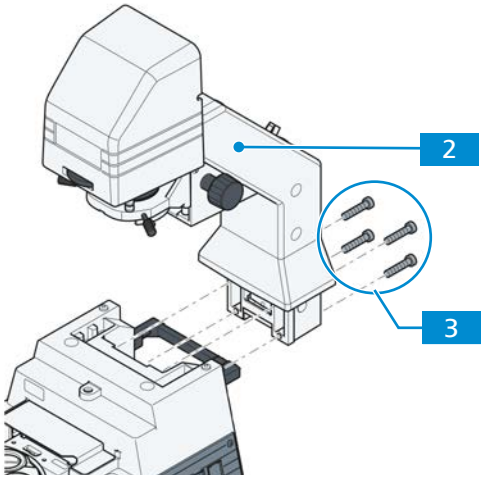
- Hex key, 4.0 mm

Procedure

1. Remove the cover 1 from the stand.



2. Assemble the illumination carrier 2 to the stand from the rear side.



3. Tighten the four fixing screws 3.

4.4.2 LCD Display

The LCD Display is only available on Axio Observer 5.

Position The LCD display is integrated in the carrier for transmitted light illumination or for material stands with a holder.

Purpose The LCD display shows the status of the microscope and is used for configuration.

Axio Observer 5

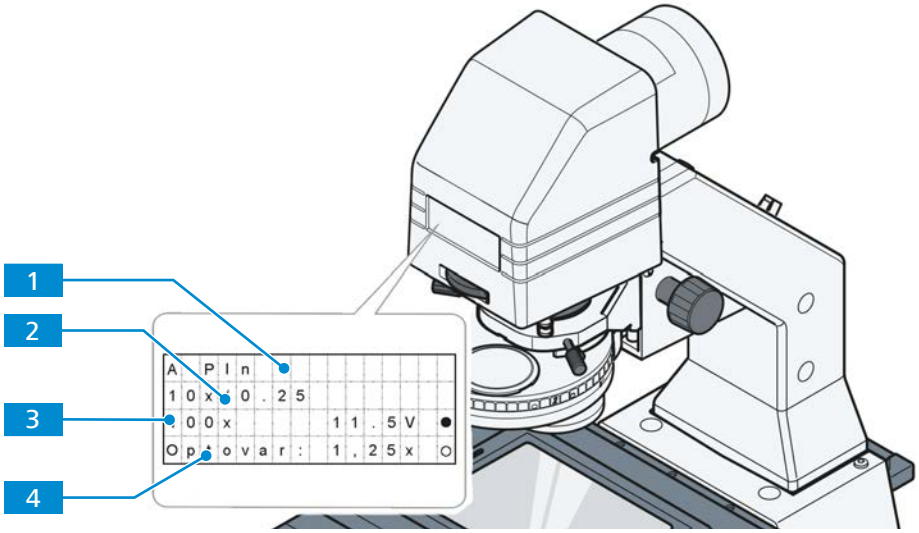


Fig. 7: LCD display on the Axio Observer 5

1	Name of the objective	2	Objective magnification and possible contrast techniques
3	Overall magnification, lamp voltage and TL shutter details, condenser parameters	4	Optovar magnification

Axio Observer 5 materials

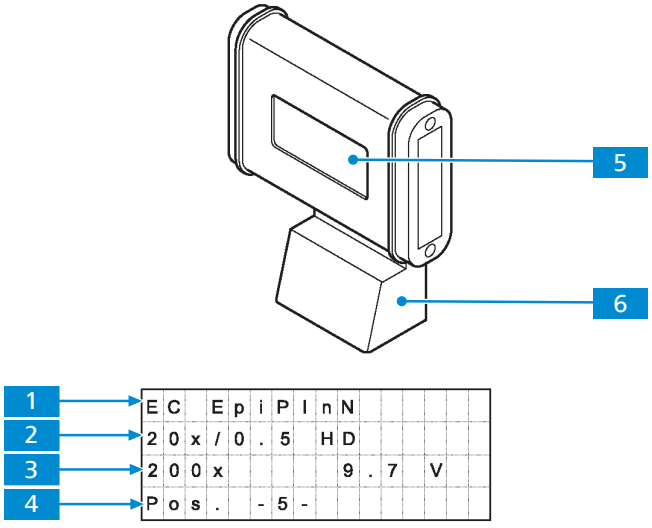


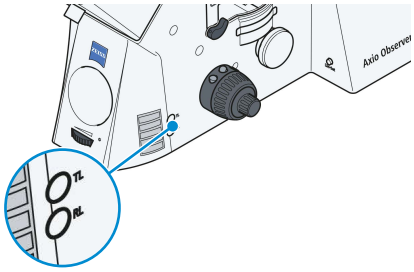
Fig. 8: LCD with holder on the Axio Observer 5 materials

1	Name of the objective	2	Objective magnification and possible contrast techniques
3	Overall magnification, lamp voltage and TL shutter details, condenser parameters	4	Information on contrast techniques (position of reflector turret)
5	LCD display	6	Holder

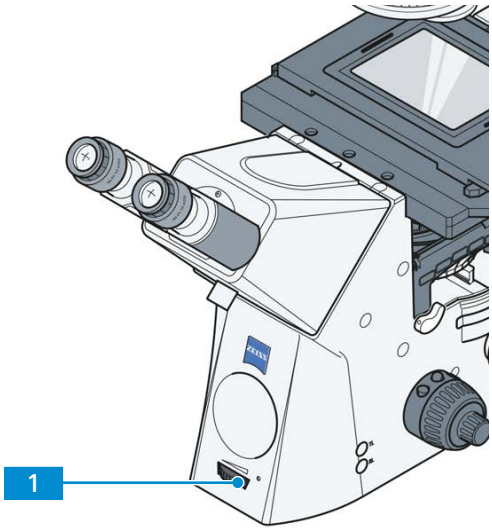
4.4.2.1 Adjusting the Brightness of the LCD Display

Procedure

1. Press the **RL** button (> 1 s) to turn on or off the LCD background lighting.



2. Hold the **RL** button while rotating the illumination intensity control wheel 1 to adjust the brightness of the LCD.



4.4.2.2 Assembling the LCD Display with Holder

> **Info**
> Only available for Axio Observer 5 materials.

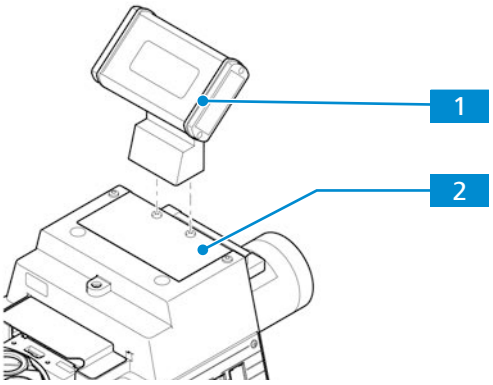


Fig. 9: Installing the LCD with holder

Prerequisite

- ✓ No carrier for transmitted light illumination is installed.
- ✓ The microscope is switched off.

Procedure

1. Place the LCD holder 1 on the cover plate 2, such that the cover plate's two fixing screws fit into the corresponding receptacles at the holder's bottom.
2. Connect the LCD holder to the *LCD display socket [▸ 29]* on the base stand.

4.5 Controls and Interfaces on the Stand

Interfaces are communication links between two systems that are connected to each other, such as software and software, software and hardware, or hardware and hardware.

4.5.1 Controls and Interfaces on the Axio Observer 3

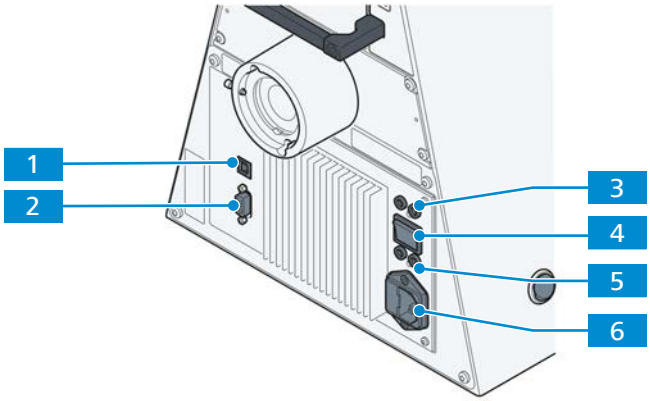


Fig. 10: Interfaces on the Axio Observer 3

No.	Name	Function
1	External high speed shutter socket	Connection to the external high speed shutter.
2	CAN connecting socket	Interface for microscope hardware control via CAN bus.
3	Transmitted light socket	Power supply of the TL illumination unit.
4	**TL/RL** button	Switch between TL and RL.
5	Socket for reflected light	Power supply of the RL illumination unit.
6	Power socket	Power supply of the microscope.

4.5.2 Controls and Interfaces on the Axio Observer 5

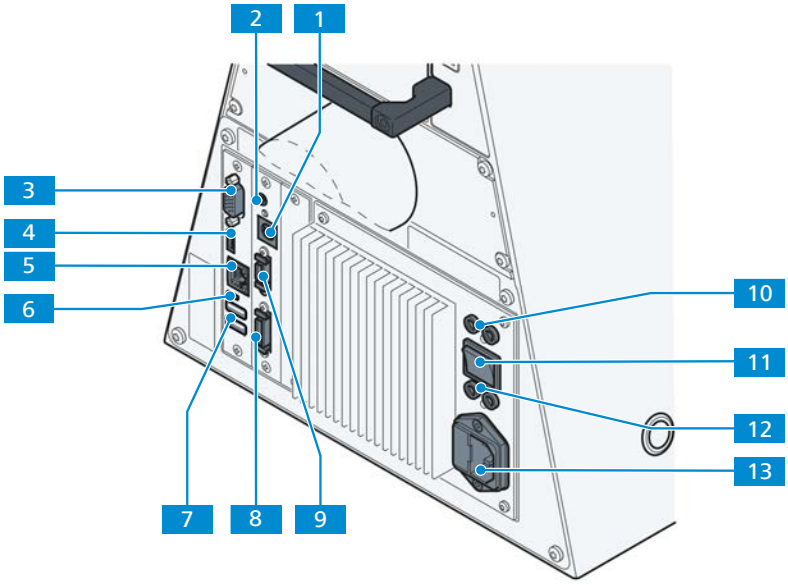


Fig. 11: Interfaces on the Axio Observer 5

No.	Name	Function
1	External high speed shutter socket	Connection to the external high speed shutter.
2	Trigger socket (IN/OUT) for shutter	Connection to the trigger for shutter control.
3	CAN connecting socket	Interface for microscope hardware control via CAN bus.
4	Mini HDMI port	For ZEISS Service only.
5	TCP/IP port	Computer communication
6	USB-C port	Connection to microscope system PC.
7	2 x USB-A port	Interface for USB/RS232-adapter, USB Stick or other USB devices like mouse/keyboard.
8	LCD display socket	Connection to the LCD of the transmitted light illumination carrier.
9	Transmitted light shutter socket	Connection to the transmitted light shutter.
10	Transmitted light socket	Power supply of the TL light source.
11	**TL/RL** button	Switch between TL and RL.
12	Reflected light socket	Power supply of the RL light source.
13	Power socket	Power supply of the microscope.

4.5.3 Controls and Interfaces on the Axio Observer 7

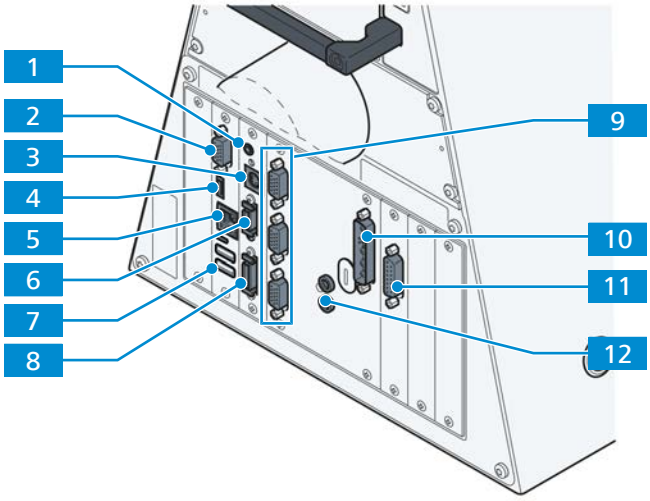


Fig. 12: Interfaces on the Axio Observer 7

No.	Name	Function
1	Trigger socket (IN/OUT) for shutter	Connection to the trigger for shutter control.
2	CAN connecting socket	Interface for microscope hardware control via CAN bus.
3	External high speed shutter socket	Connection to the external high speed shutter.
4	USB connection port	Connection to a PC.
5	TCP/IP port	Computer communication
6	Connector for transmitted light shutter	Connection to the transmitted light shutter.
7	2 x USB-A port	Interface for USB/RS232-adapter, USB Stick or other USB devices like mouse/keyboard.
8	Not used	
9	CAN connection port (3x)	Connection to CAN components.
10	Socket for power supply unit VP232-2 3	Connection to the power supply unit VP232-2 3.
11	Connector for closed-loop sensor Z drive	Connection to the closed-loop sensor Z drive.
12	Socket for transmitted light	Connection to the transmitted light illumination unit.

Tab. 2: Functions of the interfaces

4.6 Microscopy and Contrast Techniques

Depending on the configuration of the microscope, the following microscopy and contrast techniques are available:

	Transmitted light (TL)	Reflected light (RL)
Brightfield (BF)	*x [▸ 77]*	*x [▸ 81]*
Darkfield (DF)	-	*x [▸ 83]*
Differential Interference Contrast (DIC)	*x [▸ 127]*	*x [▸ 125]*
Differential Interference Contrast in circularly polarized light (C-DIC)	-	*x [▸ 126]*
Fluorescence contrast	-	*x [▸ 84]*
Improved Hoffman Modulation Contrast (iHMC)	*x [▸ 133]*	-
Phase Contrast (Ph)	*x [▸ 80]*	-
PlasDIC Contrast	*x [▸ 130]*	-
Polarization contrast (Pol)	-	*x [▸ 85]*
Total Interference Contrast in circularly polarized light (TIC)	-	*x [▸ 86]*

4.7 Equipment and Compatibility Table

Equipment	Option	Axio Observer 3	Axio Observer 5	Axio Observer 7
Base stand	manual	+	+	-
	motorized	-	o*	+
Display	*LCD display [▸ 26]*	-	o**	-
	TFT display [▸ 137]	-	-	+
	TFT display with docking station	-	-	o
Light Manager [▸ 67]		+ (simple)	+	+
Contrast Manager [▸ 124]		-	-	+
Control ring [▸ 23]	right	-	+	+
	left	-	-	+
Vertical stop for focus drive [▸ 73]		-	+	-

Equipment	Option	Axio Observer 3	Axio Observer 5	Axio Observer 7
Automatic Component Recognition [▸ 116]	Nosepiece ACR	-	-	o
	Reflector turret ACR	-	o	o
Power supply unit	internal	+	+	-
	external	-	-	+
Z drive control (flat control knob)	right	o	-	o
	left	o	+	o
Transmitted Light Illumination Carrier [▸ 24]	with LCD display	-	o**	-
	without LCD display	o	-	o

Tab. 3: Equipment and Compatibility Table

+ = included
o = optional
o* = optional: reflector turret mot., reflected-light illuminator mot., LD condenser 0.55 mot.
o** = required (either carrier for transmitted-light illumination with LCD display (423922-0000-000) or holder with LCD display and Light Manager (432923-0000-000)
- = not available

5 Tube and Eyepieces

5.1 Binocular Tube

Various tubes with different inclination angles enable suitable eye levels to be selected for observation.

5.1.1 Binocular Tube 45°/23 with Manual Shutter

Purpose Binocular tubes are used to visualize the microscopic image by means of the eyepieces.

Position The binocular tubes are mounted onto the tube mount of the stand.

Function The pupil distance and the viewing height can be adjusted with the aid of the binocular section.

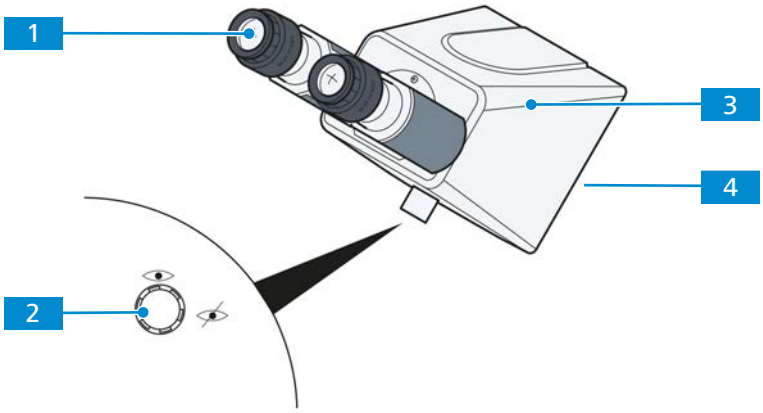


Fig. 13: Binocular Tube 45°/23 with manual shutter vis

1	*Eyepiece [▶ 34]*	2	Rotary button for setting the shutter 100% visual observation 0% visual observation (light shutter)
3	Tube	4	Dovetail ring mount

5.1.2 Installing the Binocular Tube

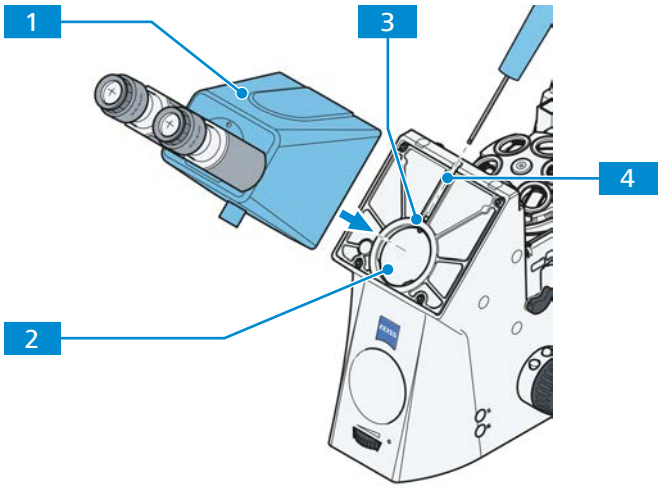


Fig. 14: Installing the binocular tube

1	Tube	2	Tube mount
3	Screw	4	Shaft

Parts and Tools Hex key, 3.0 mm

Procedure

1. Loosen the screw 3 through the shaft 4.
2. Remove the dust cap from the tube mount 2 on the stand.
3. Remove the dust cap from the dovetail ring of the tube.
4. Insert the tube 1 with the dovetail ring into the tube mount 2.
5. Align the tube to the outer edges of the stand.
6. Tighten the screw 3.

5.1.3 Indicators on the Binocular Tube

Indicator	Function
	100% visual observation
	0% visual observation
	Bertrand lens activated
	50% visual observation and 50% documentation
	100% documentation

5.2 Eyepieces

Purpose The eyepieces serve to observe the microscopic image.

Position The eyepieces are inserted into the eyepiece sockets of the binocular tube.

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 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.

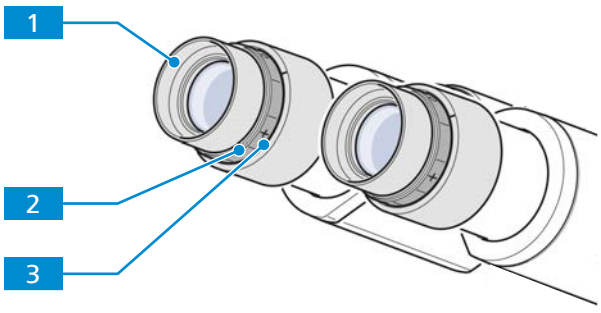


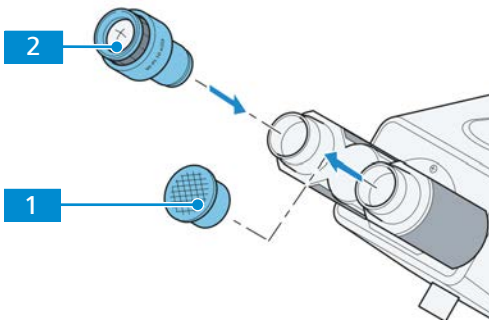
Fig. 15: Eyepiece

1 Eyecup (e.g. Foldover rubber eyecup)
2 Focusing ring
3 Diopter scale

5.2.1 Inserting the Eyepieces

Procedure

1. Remove both dust caps 1 from the tube.



2. Take the eyepieces out of their boxes.
3. Insert the eyepieces 2 into the tube sockets as far as they will go.

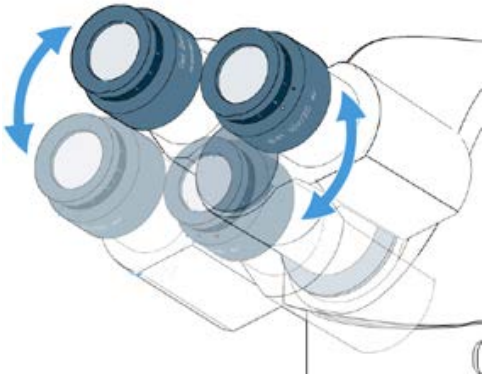
> **Info**
>
> Instead of an eyepiece an auxiliary microscope may be inserted into the tube sockets. The auxiliary microscope is used to adjust contrast settings, e.g. when using phase contrast, or to observe the back focal plane of a given objective.

5.2.2 Adjusting the Eyepieces

> **Info**
>
> The rubber cups of the eyepieces can be folded in or out depending on the viewing preferences.
>
> Once the eyepieces have been adjusted, the focus of a sample should only be changed by turning the focusing knob.

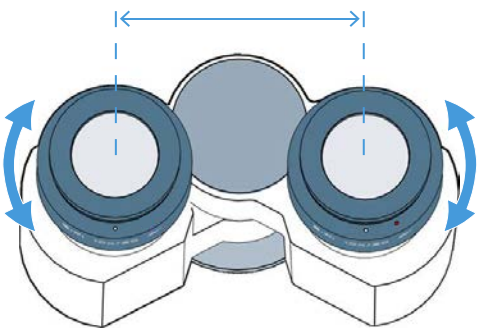
Viewing height

1. Set the viewing height by swivelling the whole eyepiece unit a full 180 ° upwards or downwards.



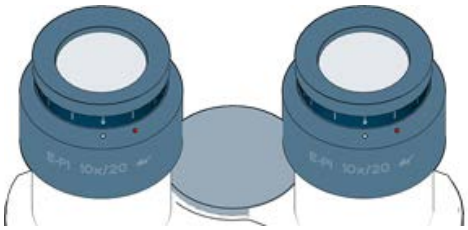
Interpupillary distance

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



Compensation for visual impairments

1. Ensure the left eyepiece is in the zero (0) position.



   → without eyepiece reticles: set to the white point.
   → with eyepiece reticles: set to the red point.
2. Select a magnification between 10x and 20x.
3. Look at the sample through the left eyepiece with the left eye only.
4. Focus the sample.
5. Look at the sample through the right eyepiece with the right eye only.
6. Turn the right eyepiece ring until the sample is in focus.

Viewing with glasses

1. Turn the ring of each eyepiece so that it is in the zero (0) position.

5.3 Troubleshooting for Tube and Eyepieces

Symptom	Measure
Shadows or inhomogeneous image brightness in the field of view; the field is not entirely visible	▪ Move the vis/phot shift knob to the correct functional position (end position).
Left and the right field of view cannot be brought together in one image	▪ *Correct defective vision with the focusing eyepiece. [▸ 35]*
	▪ *Correct defective vision with the focusing eyepiece. [▸ 35]*
Eye fatigue when using the microscope	▪ *Correct defective vision with the focusing eyepiece. [▸ 35]*
	▪ *Correct defective vision with the focusing eyepiece. [▸ 35]*
	▪ *Set the illumination intensity [▸ 65]* of the used light source to an appropriate level.
	▪ Contact your local ZEISS service representative.
Dirt or dust in the field of view	▪ *Clean the optical surfaces of the affected components [▸ 91]*.

6 Nosepiece and Objectives

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

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

The following features and controls are available:

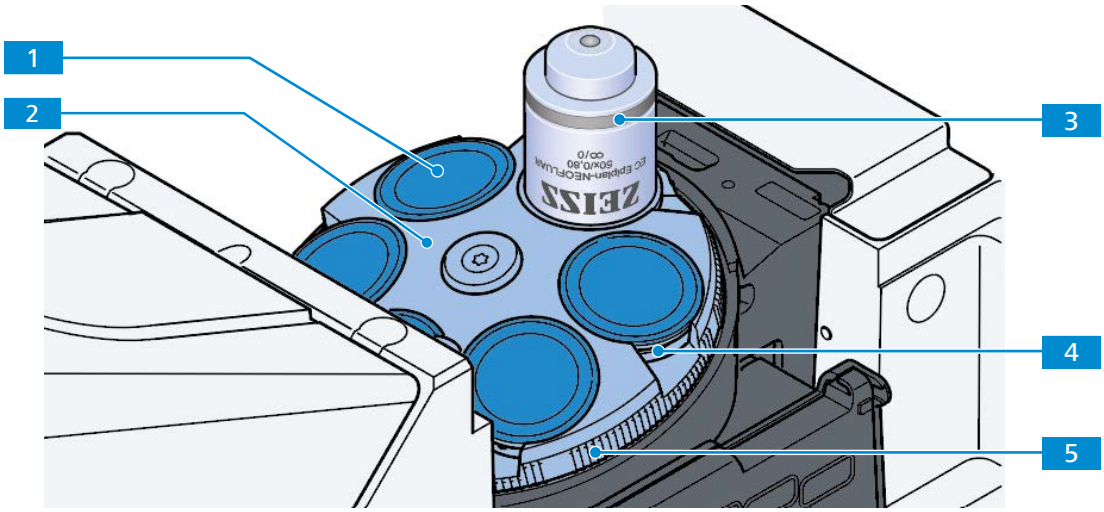


Fig. 16: Nosepiece with objective

1	Cover cap	2	Nosepiece
3	Objective	4	Slot for *DIC-sliders [▸ 132]*
5	Knurled ring for swivelling the nosepiece		

6.1 Objective Labeling

Purpose The objective is a light collecting optical system.

Position The objective is screwed into the nosepiece.

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

Fig. 17: Objective labeling

Pos.	Designation	Value (example)
1	Objective class	e.g. LD A-Plan, Plan-Apochromat, Fluar
2	Magnification	
3	Optical System	ICS- Optic ∞
4	Color coding of magnification	See 2.
5	Contrast method	Text color: ▪ Black = Standard ▪ Red = Pol/DIC ▪ Green = Ph 0, Ph 1, Ph 2, Ph 3
6	Numerical Aperture	e.g. 0.25
7	Application	▪ Immersion Medium (Oil / W/ Glyc) ▪ Adjustable cover glass correction (Corr.) ▪ Contrast method. See 5.
8	Designed for polystyrene	(PS)
9	Cover glass thickness (mm)	e.g. 1.0

6.2 Assembling Objectives

NOTICE

Dust-sensitive components

If dust-sensitive components e.g. unused nosepiece openings remain uncovered, particles may enter the microscope and may damage its optics and mechanics permanently.

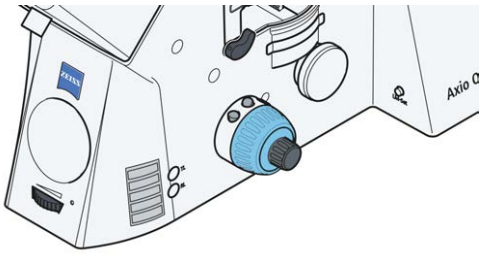
▸ Always close unused nosepiece openings with blind caps.

Info

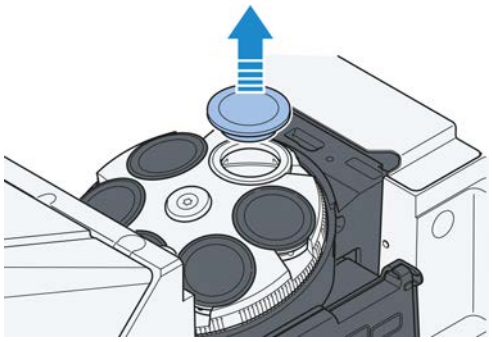
The objectives should be installed beginning from nosepiece position **1** in order of increasing magnification.

Procedure

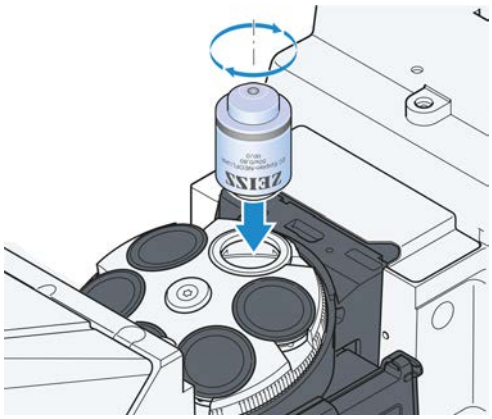
1. Fully lower the nosepiece using the focusing knob.



2. Remove the cover cap or screw out the present objective from the relevant nosepiece opening.



3. Take the objective out of its case.
4. Carefully screw the objective into the opening. Make sure it engages properly in the nose-piece's thread.



6.3 Troubleshooting for Nosepiece and Objectives

Symptom	Measure
Shadows or inhomogeneous image brightness in the field of view; the field is not entirely visible	▪ Ensure that the nosepiece with the objective is clicked into place.
Low resolving power and poor image contrast	▪ Wrong cover glass thickness. Use standardized 0.17 mm cover glasses. ▪ Immersion objectives used without (the correct) immersion liquid. Use Immersol 518 F® immersion oil from ZEISS. ▪ *Clean the optical surfaces of the affected components [▸ 91]*. ▪ *Clean the optical surfaces of the affected components [▸ 91]*.
Asymmetric image sharpness, e.g. one side is sharp, one side is blurred	▪ Ensure that the nosepiece with the objective is clicked into place.
Major focus differences after objective change	▪ *Correct defective vision with the focusing eyepiece. [▸ 35]* ▪ *Screw the objective in as far as it will go. [▸ 38]* ▪ Mount the tube lens or remove the unnecessarily tube lens.
Dirt or dust in the field of view	▪ *Clean the optical surfaces of the affected components [▸ 91]*. ▪ Remove the bubbles by applying new oil.
The focal deviation is high when objectives are switched over	▪ Perform a parfocality calibration. ▪ *Screw the objective in as far as it will go. [▸ 38]*
Reduced image quality	▪ Wrong cover glass thickness. Use standardized 0.17 mm cover glasses. ▪ Set the correction ring to the correct thickness. ▪ Turn slide so that the sample is facing up. ▪ Clean the front lens of the objective.
Out of focus	▪ Perform a parfocality calibration. ▪ *Screw the objective in as far as it will go. [▸ 38]* ▪ Wrong cover glass thickness. Use standardized 0.17 mm cover glasses.
One side of the field of view (up, down, right, or left) is not in focus	▪ Insert the sample in the specimen holder correctly and clamp it. ▪ *Attach the stage correctly [▸ 46]*.

7 Condensers

A condenser is a part of the illumination system of the microscope, consisting of one or more lenses (or mirrors) with their mounts and usually a diaphragm, whose task is the collection, control and concentration of radiation in the illumination aperture.

There are several types of condensers. Determine which type of condenser you are using.

7.1 LD Condenser 0.35 H Ph PlasDIC DIC iHMC

Purpose Condensers are used to optimize the transmitted light illumination. The condenser is usable for brightfield, phase contrast, PlasDIC, DIC, and iHMC applications.

Position The condenser is mounted on the carrier for transmitted light illumination.

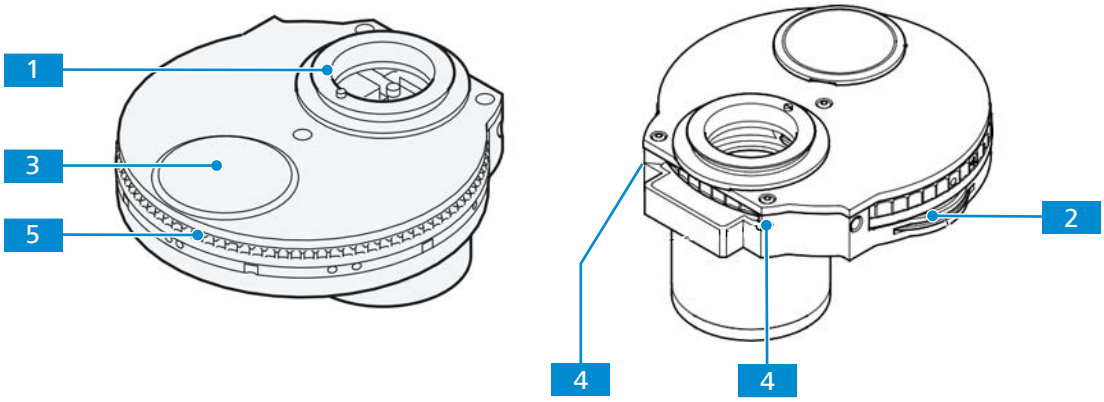


Fig. 18: LD Condenser 0.35 Ph PlasDIC DIC iHMC

1	Dovetail ring	2	Aperture stop
3	Mounting hole for contrast modules	4	Two access holes
5	5-position modulator disk		

7.2 LD Condenser 0.55 H Ph1 Ph2 Ph3 DIC

Purpose Condensers are used to optimize the transmitted light illumination.

Position The condenser is mounted on the carrier for transmitted light illumination.

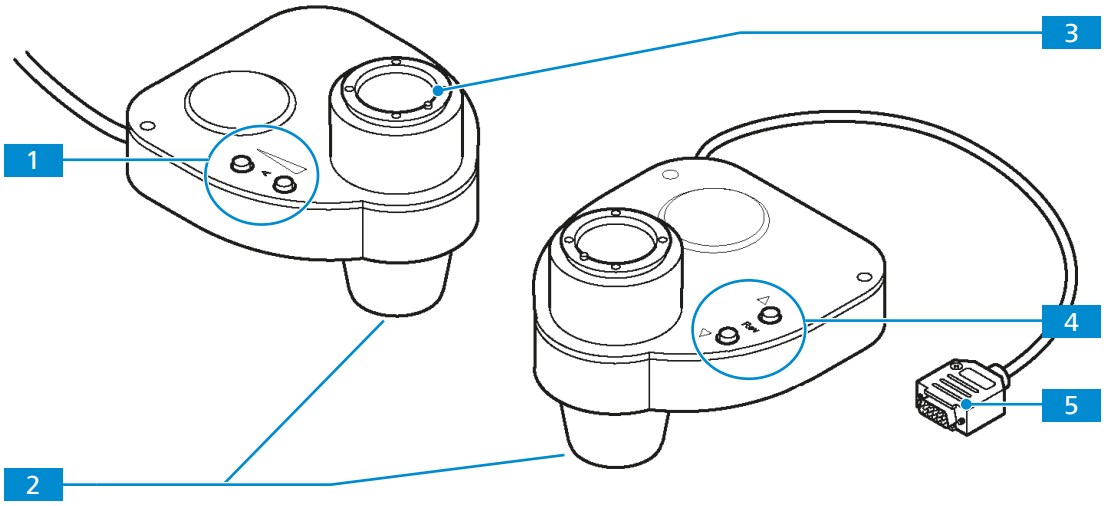


Fig. 19: LD *condenser 0.55, motorized*

1	Keys **A** for adjusting the aperture stop (open and close)	2	Front lens
3	Dovetail ring	4	Keys **Rev** for adjusting the position of the modulator disk (forwards and backwards)
5	Connecting plug		

7.3 Assembling the Condenser

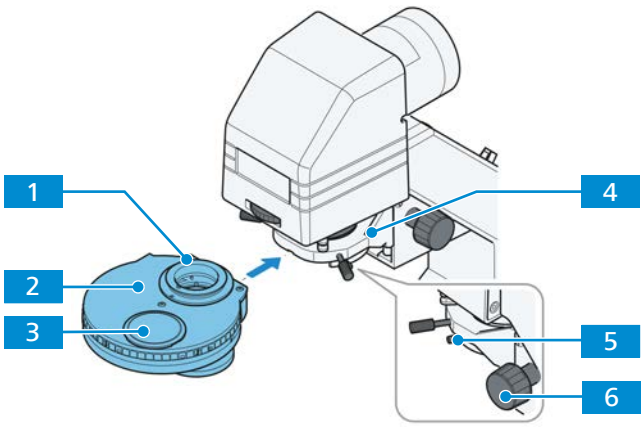


Fig. 20: Assembling the condenser

1	Dovetail ring	2	Condenser
3	Mounting hole for contrast modules	4	Condenser carrier
5	Clamping screw	6	Condenser height control

Parts and Tools Hex key, 1.5 mm

Prerequisite

- ✓ The carrier for transmitted light illumination is tilted backwards.
- ✓ The condenser carrier is set to its highest position.
- ✓ The condenser module for the desired microscopy and contrast method (e.g. *iHMC [▸ 133]*, DIC) is inserted.

Procedure

1. Take the condenser 2 with the dovetail ring 1 facing upwards.
2. Attach the condenser with the dovetail ring 1 to the condenser carrier 4.
3. Fasten the condenser clamping screw 5.
4. Carefully, tilt the carrier for transmitted light illumination back into position.

7.4 Centering the Annular Phase Diaphragm of the Condenser

Parts and Tools

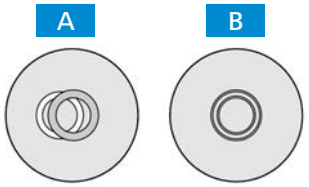
- 2x Hex key, 1.5 mm

Prerequisite

- ✓ A suitable condenser with modulator disk is installed.
- ✓ The illumination is adjusted for transmitted light brightfield microscopy using the KÖHLER method.

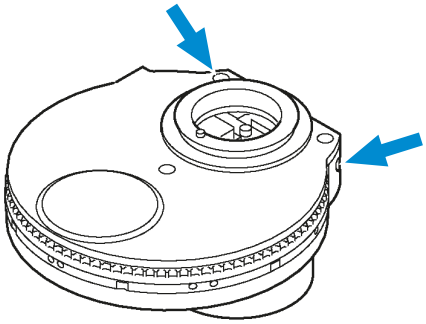
Procedure

1. Set the modulator disks to position **Ph** (phase contrast).
2. Remove one eyepiece from the binocular tube or replace it with the auxiliary microscope.
3. Observe the exit pupil of the objective.
4. Check the centering and the overlap of the lighter annular phase diaphragm (in the condenser) with the darker phase ring (in the objective).



→ Both rings must be centered and overlapping B.

5. If the overlap is not exact A, recenter the lighter annular diaphragm. Use two hex keys.



6. Remove the auxiliary microscope and replace the eyepiece.

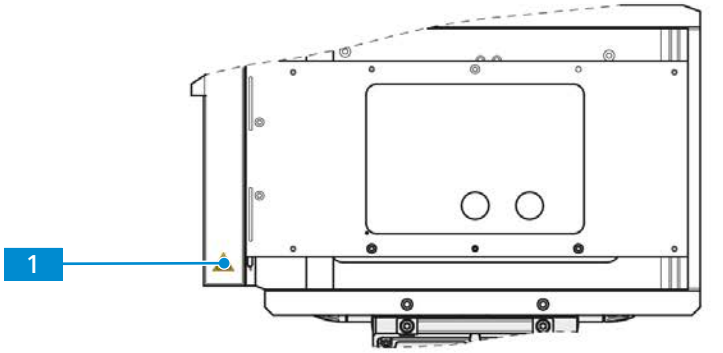
7.5 Troubleshooting for Condenser

Symptom	Measure
Shadows or inhomogeneous image brightness in the field of view; the field is not entirely visible	▪ Set the condenser correctly (adjust, center).
Low resolving power and poor image contrast	▪ Focus the condenser and swivel front lens 0.9 in or out correctly. ▪ *Clean the optical surfaces of the affected components [▸ 91].*
Asymmetric image sharpness, e.g. one side is sharp, one side is blurred.	▪ Set the condenser correctly (adjust, center).
Dirt or dust in the field of view	▪ Focus the condenser and swivel front lens 0.9 in or out correctly. ▪ *Clean the optical surfaces of the affected components [▸ 91].*

8 Stages

A stage is a platform at right angles to the optical axis of the microscope, which carries the sample and which is often fitted with mechanical movements (as in a mechanical stage) to allow easy positioning of the object in the x- and y-axis, and movement along, and rotation about the z-axis.

8.1 Labels on the Stage



Pos.	Symbol	Description
1		Crushing Hazards Fingers may be pinched!

8.2 Mechanical Stage 130x85 R/L

Purpose Mechanical stage designed to hold and position samples.

Position The mechanical stages are mounted directly onto the stand.

Function The sample is fixed on the stage by means of mounting frames or other insert plates.

The sample is positioned in the beam path by means of a coaxial drive in x- and y-direction.

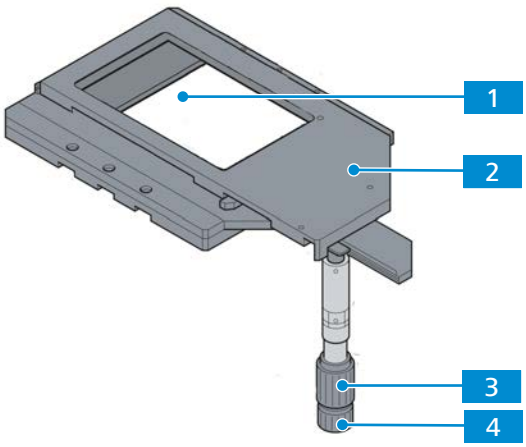


Fig. 21: Mechanical stage, 130x85 R/L

1	Opening for mounting frames or insert plates (size 160 x 110 mm)	2	Stage
3	Knurled knob for y-adjustment	4	Knurled knob for x-adjustment

8.3 Specimen Stage 250x230, for Mounting Frame M and Object Guide

Purpose The specimen stage is used for fixing and positioning the sample for examination.

Position The stage is mounted on the stand.

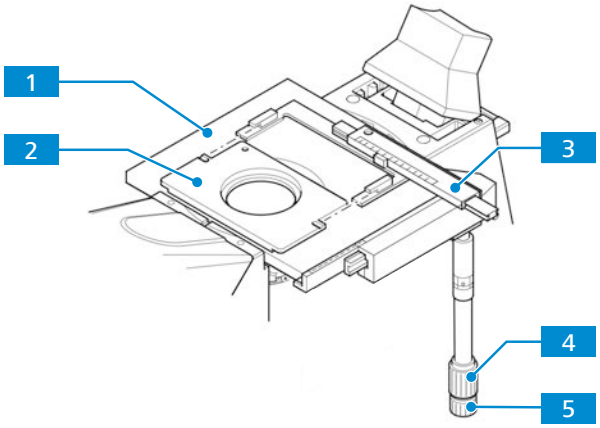


Fig. 22: Specimen stage, 250x230

1	Specimen stage	2	Mounting frame M for object guide
3	Object guide	4	Knurled knob for x-adjustment
5	Knurled knob for x-adjustment		

8.4 Assembling the Mechanical Stage 130x85 R/L

The stage can be mounted with the drive on the right- or the left-hand side.

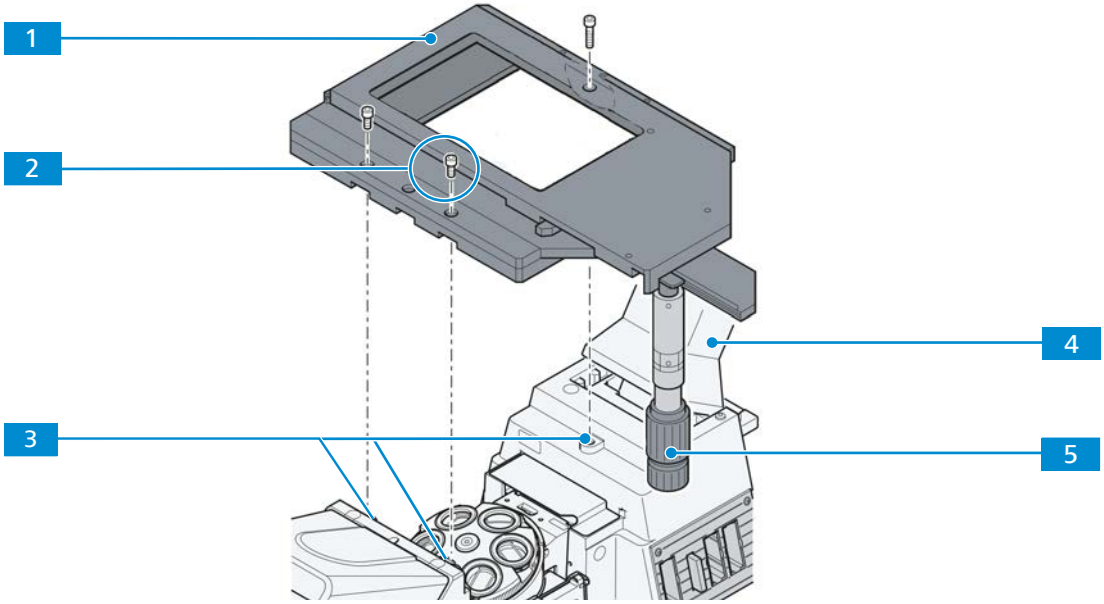


Fig. 23: Installing the mechanical stage 130x85 R/L

1	Mechanical stage	2	Fixing screw (3x)
3	Mounting hole (3x)	4	Carrier for transmitted light illumination
5	Knurled knob		

Parts and Tools Hex key, 3.0 mm

Prerequisite
- ✓ The carrier for transmitted light illumination 4 is tilted backwards.
- ✓ The nosepiece is in lowest position.

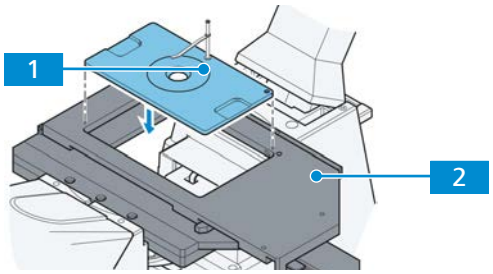
Procedure
1. Take the stage 1 and position it with the knurled knob 5 of the stage on the right- or the left-hand side.
2. Set down the stage on the stand, matching its mounting holes 3 to those of the stand.
3. Fix the stage to the stand with a screw 2 in each of the stage's three mounting holes.

8.5 Inserting the Mounting Frame K

> **Info**
> The **mounting frame K, low profile** is not compatible with the **scanning stage 130x100 STEP**.

Prerequisite
- ✓ *The stage is fixed to the stand [▸ 46].*

Procedure
1. Place the mounting frame 1 on the stage 2.
   Make sure its red-dotted corner matches the red-dotted corner of the stage.



2. Diagonally press the mounting frame against the springs and into the stage's opening.
3. Verify that the mounting frame is seated correctly.

Proceed in the reverse order for removal.

8.6 Installing the Heatable Microscope Stage S1

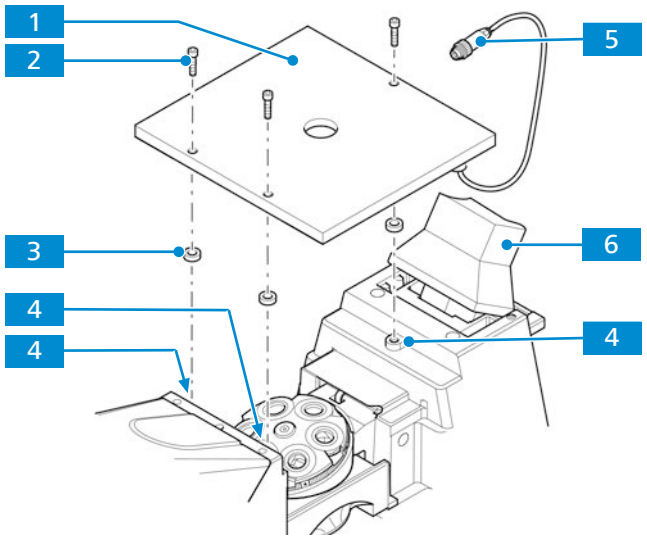


Fig. 24: Installing the heatable microscope stage S1

1	Heatable stage S1	2	Fixing screw (3x)
3	Spacer (3x)	4	Mounting hole (3x)
5	Power plug	6	Carrier for transmitted light illumination

Parts and Tools
- 3 x Spacer disk
- Hex key, 3.0 mm

Prerequisite
- ✓ If applicable, the carrier for transmitted light illumination 6 is tilted backwards.

Procedure
1. Place a spacer disk 3 on each of the mounting holes 4 at the stand.
2. Set down the stage 1 on the stand, matching its mounting holes to those of the stand.
3. Fix the stage to the stand with a fixing screw 2 in each of the stage's three mounting holes.
   → Ensure that each screw passes through the hole in the relevant spacer disk.
4. Connect the plug 5 of the stage's cable to the power supply (see separate manual).

Proceed in the reverse order for removal.

8.7 Installing the Gliding Stage Z

Parts and Tools
- 3 x Spacer disk
- Hex key, 3.0 mm

Prerequisite
- ✓ If applicable, the carrier for transmitted light illumination is tilted backwards.

Procedure
1. At the stage's bottom side, unmount the three support elements.
2. Place a spacer disk on each of the mounting holes at the stand.
3. Set down the stage on the stand, matching its mounting holes to those of the stand.
4. Fix the stage to the stand with a screw in each of the stage's three mounting holes.

Proceed in the reverse order for removal.

8.8 Installing the Scanning Stages 130x100

Info

If using flat mounting frames which are flush to the stage and 160x110 stage pinhole apertures do not use spacer disks.

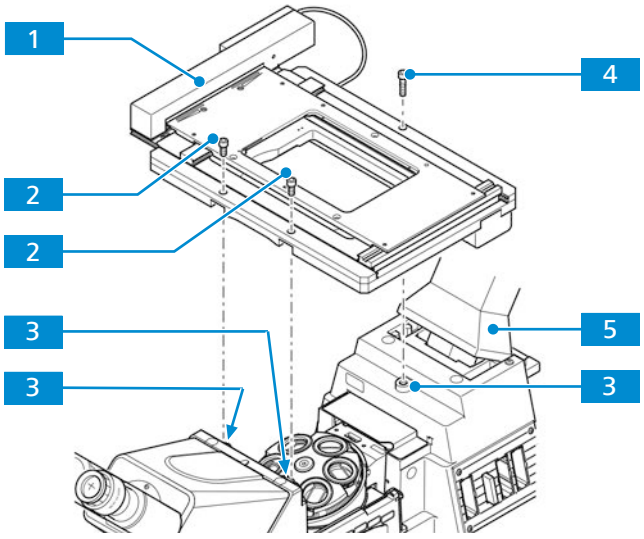


Fig. 25: Installing the Scanning stage 130x100

1	Scanning stage	2	Fixing screw (2x)
3	Mounting hole (3x)	4	Fixing screw

5 Carrier for transmitted light illumination

Parts and Tools

- Hex key, 3.0 mm

Prerequisite

- ✓ If applicable, the carrier for transmitted light illumination 5 is tilted backwards.

Procedure

1. If required, place a spacer disk on each of the mounting holes 3 at the stand.
2. Set down the stage 1 on the stand, matching its mounting holes to those of the stand.
3. Fix the stage to the stand with one screw 2 / 4 in each of the stage's three mounting holes.
4. Connect the stage to its separate controller via cable.

8.9 Installing the Scanning Stages 130x85 MAT

Info

If using flat mounting frames which are flush to the stage and 160x110 stage pinhole apertures do not use spacer disks.

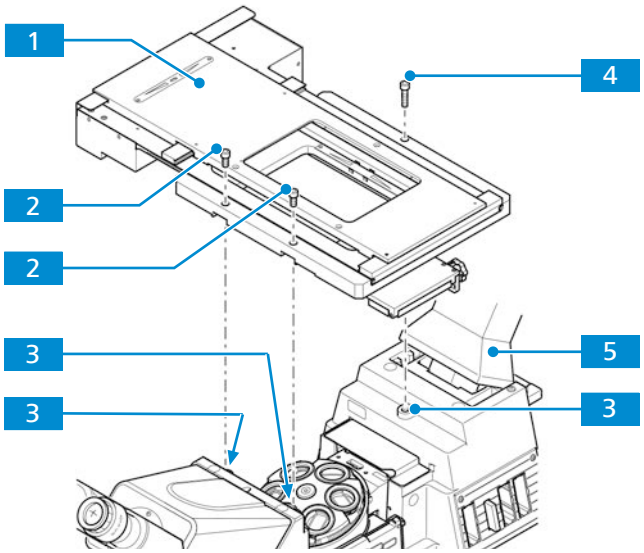


Fig. 26: Installing the Scanning stage 130x85 MAT

1	Scanning stage	2	Fixing screw (2x)
3	Mounting hole (3x)	4	Fixing screw
5	Carrier for transmitted light illumination		

Parts and Tools

- Hex key, 3.0 mm

Prerequisite

- ✓ If applicable, the carrier for transmitted light illumination 5 is tilted backwards.

Procedure

1. If required, place a spacer disk on each of the mounting holes 3 at the stand.
2. Set down the stage 1 on the stand, matching its mounting holes to those of the stand.
3. Fix the stage to the stand with one screw 2 / 4 in each of the stage's three mounting holes.
4. Connect the stage to its separate controller via cable.

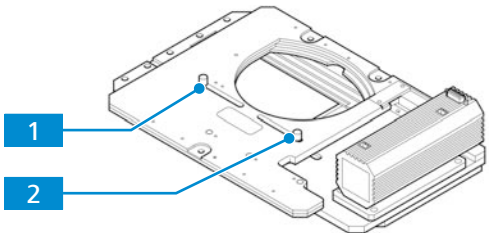
8.10 Adjusting the Travel Range of the Scanning Stage 130x85 mot P; CAN

Parts and Tools Hex key, 1.5 mm

Limiting the range for X direction movements

Procedure

1. At the stage's bottom side, loosen one of the stop screws 1.

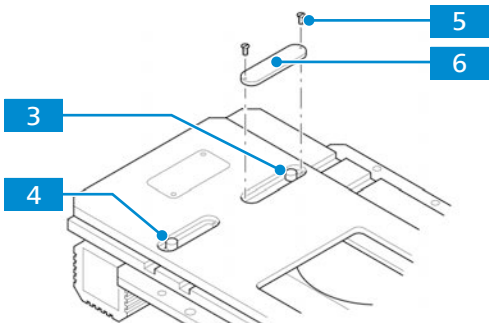


2. Guide the screw to the desired position and fasten it again.
3. Repeat the former steps for the second stop screw 2.

Limiting the range for Y direction movements

Procedure

1. At the stage's top side, screw out the two fixing screws 5 of the stop screw's cover .



2. Remove the cover 6.
3. Loosen one of the stop screws 3.
4. Guide the screw to the desired position and fasten it again.
5. Repeat the former steps for the second stop screw 4.

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

8.11 Troubleshooting for Stages

Symptom	Measure
Out of focus	▪ Insert the sample in the specimen holder correctly and clamp it. ▪ *Attach the stage correctly [▸ 46]*. ▪ Check the orientation of the sample: The cover glass points towards the objective. ▪ Wrong cover glass thickness. Use standardized 0.17 mm cover glasses. ▪ Insert the sample in the specimen holder correctly and clamp it.
One side of the field of view (up, down, right, or left) is not in focus	▪ Insert the sample in the specimen holder correctly and clamp it. ▪ *Attach the stage correctly [▸ 46]*.
The image flows (i.e. becomes asymmetrically defocused when moving the focal point)	▪ Insert the sample in the specimen holder correctly and clamp it. ▪ *Attach the stage correctly [▸ 46]*.
The image is invisible/ dark	▪ Check if the sample carrier is in transparent position.
The image drifts	▪ Insert the sample in the specimen holder correctly and clamp it.
Dirt or dust is highly visible in the image	▪ *Clean the optical surfaces of the affected components [▸ 91]*.
Reduced image quality	▪ *Adjust the eyepieces for visual impairments [▸ 35]*. ▪ Clean the sample. ▪ *Clean the optical surfaces of the affected components [▸ 91]*. ▪ Immersion objectives used without (the correct) immersion liquid. Use Immersol 518 F® immersion oil from ZEISS. ▪ Turn slide so that the sample is facing up.

9 Reflector Turret

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

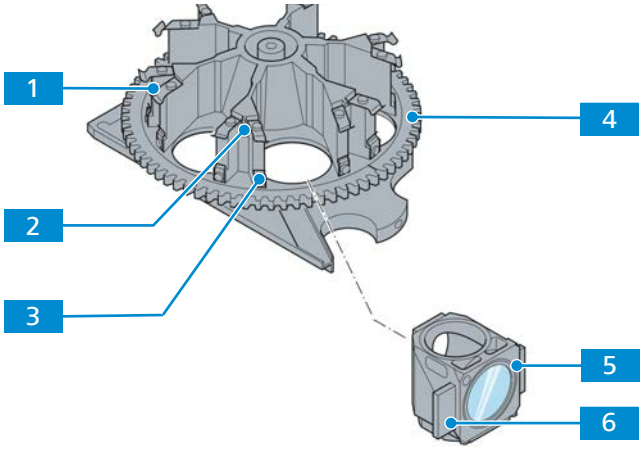


Fig. 27: Reflector turret

1	Upper spring clip (2x per position)	2	Position number
3	Lower spring clip (2x per position)	4	Reflector turret
5	Reflector module	6	Retaining element (left/right)

9.1 Installing the Reflector Turret

⚠ CAUTION

Eye damage due to refracted light

Refracted light leaving the microscope might damage the eye.

- Close the shutter for light illumination before performing any work.

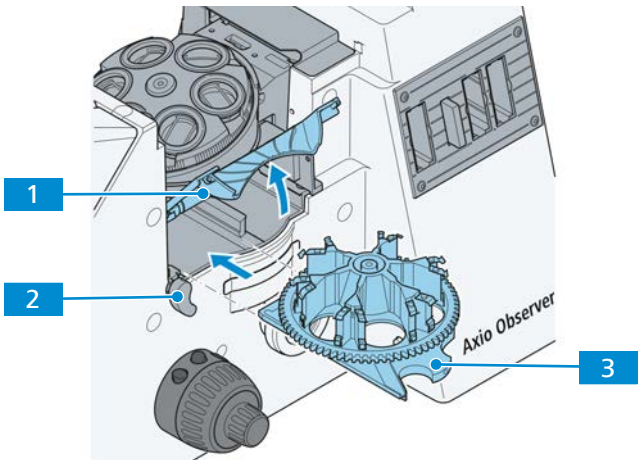


Fig. 28: Installing the reflector turret

1	Compartment cover	2	Locking lever
3	Reflector turret		

Prerequisite

- ✓ The microscope is switched off.
- ✓ The shutter for reflected light illumination is closed.

Procedure

1. Remove the protective cover.
2. At the right-hand side of the microscope, turn the turret compartment's locking lever 2 downwards.
3. Open the compartment cover 1 by tilting it upwards.
4. Carefully guide the reflector turret 3 or the dual filter wheel mot. into the compartment until the mechanical end stop.
5. Close the cover and turn the locking lever upwards.

9.2 Installing the Reflector Modules

NOTICE

Property damage due to fingerprints or scratches

The microscope contains sensitive optical components. Fingerprints or scratches can lead to malfunction of the microscope.

- Do not touch optical surfaces.
- Avoid fingerprints on the surfaces of lenses and light sources.

Info

How To - Install Push&Click Filter

This video tutorial shows how to install Push&Click reflector modules, otherwise known as filter cubes.

To ease the use and the recovery of reflector modules, the modules should be installed to defined positions. The turret positions' numeric markings 1 can be used to identify the modules.

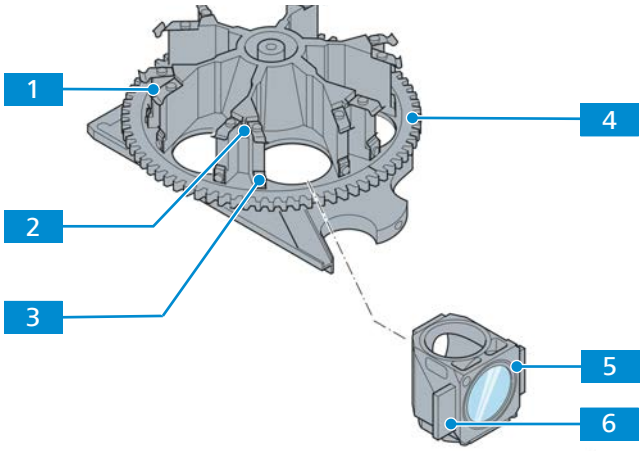


Fig. 29: Assembling the reflector modules

Prerequisite

✓ The reflector turret is half-way or *completely removed [▸ 54]* from the stand and is placed on a soft and even surface.

Procedure

1. Carefully grab the module to be removed.
2. Tilt it away from the turret center, so its retaining elements are released from the upper spring clips.
3. Remove the module 5 diagonally in upward direction and place it on a soft surface.
4. Carefully grab the module to be installed such that the excitation filter points away from the turret center and the barrier filter points downwards.
5. Tilt the module away from the turret 4.
6. Set down the lower edges of the module's retaining elements 6 on the turret position's lower spring clips 3.
7. Push the modules upper edge towards the turret's center, so the retaining elements snap in to the upper spring clips 2.

9.3 Exchanging the Filters of the Reflector Module FL P&C

NOTICE

Sensitive equipment

Changing the optical parts of a reflector module without damage requires considerable skills and utmost care.

- If possible, use fully equipped reflector modules provided by ZEISS.
- Take maximum care not to damage any optical or mechanical part when equipping a reflector module.

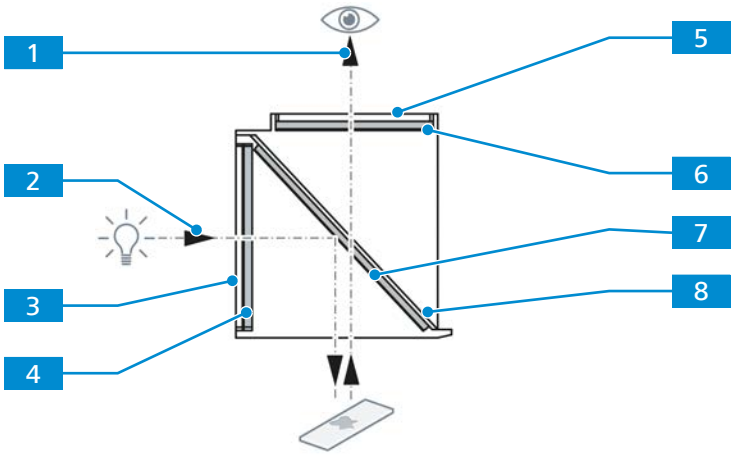


Fig. 30: Mounting the filters and the beam splitter

1	Path of the imaging beam	2	Path of the illumination beam
3	Reflective coating of the excitation filter	4	Excitation filter
5	Emission filter	6	Reflective coating of the emission filter
7	Reflective coating of the beam splitter	8	Beam splitter

Note the following orientation rules:

Emission filters 5

- should be installed with the reflective coating pointing to the inside of the reflector module.
- with a direction indicating arrow on their circumference must be installed with the arrow pointing to the inside of the reflector module.
- with a label indicating the wedge angle must be installed such that the label points to the reflector module's orientation notch.

Excitation filters 4

- should be installed with the reflective coating pointing to the outside of the reflector module.
- with a direction indicating arrow on their circumference must be installed with the arrow pointing to the inside of the reflector module.

Parts and Tools

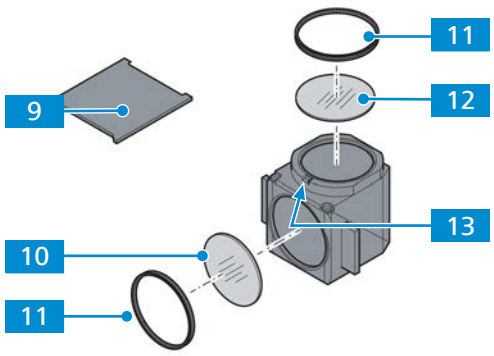
- Tool set for filter exchange
- Lint-free gloves

Prerequisite

- ✓ The reflector module is removed from the reflector insert.

Procedure

1. Unscrew the retaining ring 11 using the mounting plate 9 of the tool set .



2. **NOTICE Avoid contact of sensitive optical components to hard surfaces.**
   Turn the reflector module to let the filter slide out onto a soft surface.
3. Carefully grab the filter 10 / 12 to be installed at its circumference.
4. Set the filter into the corresponding position of the reflector module. Observe the correct orientation. Ensure that the coated surface points into the desired direction 13.
5. Screw in the retaining ring 11.

9.4 Beam Splitter

A beam splitter divides the optical beam into two separate beams.

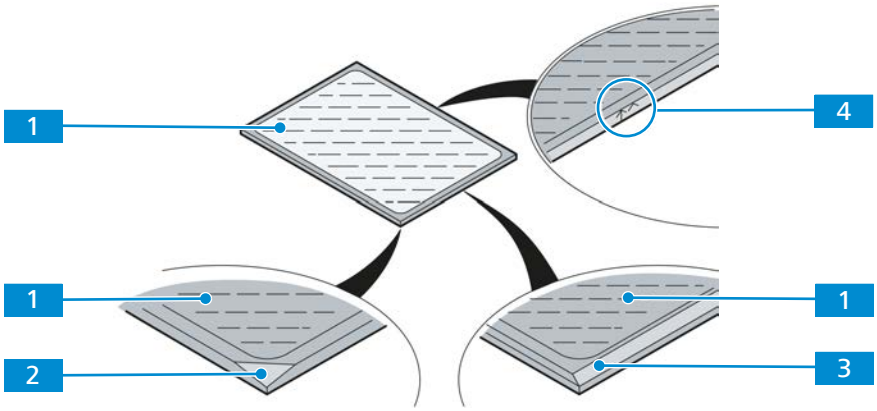


Fig. 31: Labeling of the beam splitter

1	Reflective coating of the beam splitter	2	Beveled corner
3	Beveled edge	4	Engraving

The reflective coating 1 of the beam splitter should point in the direction of the sample.

The reflective coating side 1 of the beam splitter is marked either by a beveled edge 3, a beveled corner 2, or an engraving 4.

9.5 Troubleshooting for Reflector Turret

Symptom	Measure
The image is not a fluorescent image	▪ Check reflector turret for correctly installed filters. ▪ Check for correctly selected reflector turret position (filter). ▪ Select an appropriate filter set.
The contrast in the fluorescent image is poor	▪ Check reflector turret for correctly installed filters. ▪ Check for correctly selected reflector turret position (filter). ▪ Select an appropriate filter set.
The image is invisible/ dark	▪ Select an appropriate filter set. ▪ Check reflector turret for correctly installed filters.
The image is yellowish, greenish or bluish	▪ Check reflector turret for correctly installed filters. ▪ Check for correctly selected reflector turret position (filter).
The field of view is limited or cut off	▪ Check for correctly selected reflector turret position (filter).
Reduced image quality	▪ Check for correctly selected reflector turret position (filter).

10 Light Sources

Body that independently emits visible light, possibly also radiation from adjacent spectral regions in the ultraviolet or infrared ranges, due to high temperature (e.g. sun, gas light, incandescent lamp), by electrical excitation of gas molecules (arc lamps, gas discharge lamps), by luminescence (phosphors) or by forced emission (laser).

10.1 HAL 100 Light Source

Position The HAL 100 light source can be mounted onto the transmitted or the reflected light path.

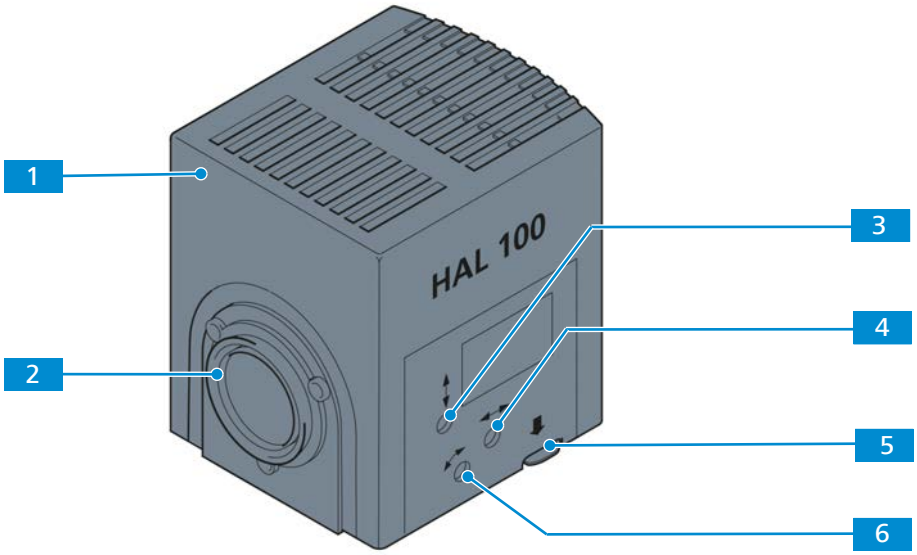


Fig. 32: HAL 100

1	Lamp housing	2	Dovetail ring
3	Vertical adjusting screw	4	Horizontal adjusting screw
5	Release latch	6	Adjusting screw

10.1.1 Exchanging the Halogen Bulb 12 V, 100 W

⚠ CAUTION

Eye damage or skin irritation due to hazardous light emission

The light source belongs to Risk Group 2 as specified in IEC 62471 and emits optical radiation and UV radiation. Eye damage or skin irritation may result from exposure.

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

⚠ CAUTION

Burning hazard due to hot light sources

Light sources can become hot during processing.

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

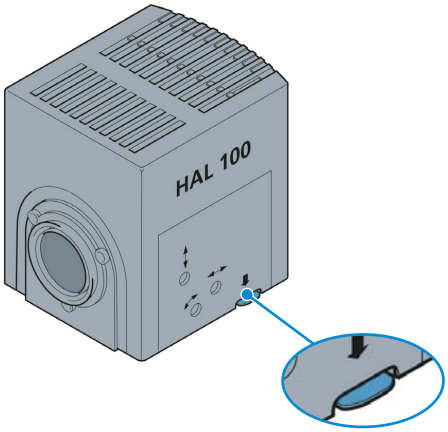
The light source does not have to be removed from the microscope for replacing the bulb.

Prerequisite

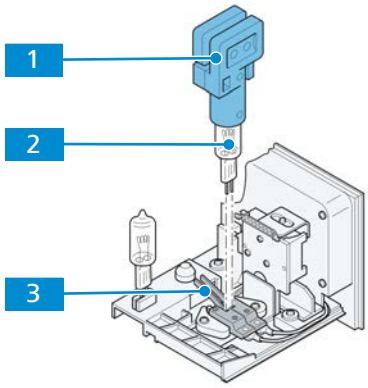
- ✓ The microscope is switched off.
- ✓ The plug of the light source's cable has been removed from the corresponding socket.
- ✓ The light source has cooled down for about 15 minutes.

Procedure

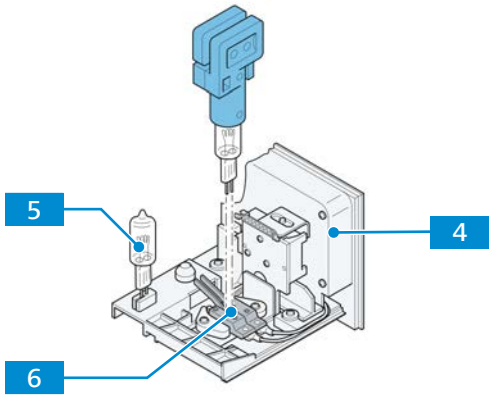
1. Press the release lever 1.



2. Pull out the lamp carrier 2 from the housing 3.
3. Put the bulb replacement tool 4 onto the old bulb 5.
4. Press down the two spring levers 6.

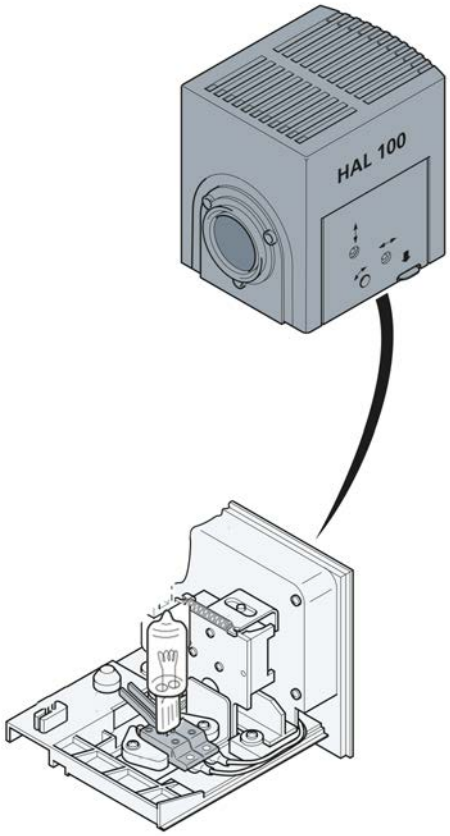


5. Remove the tool with the bulb in upward direction from the carrier 2.
6. Remove the old bulb from the replacement tool.
7. ***NOTICE*** **Do not touch the new bulb with bare fingers! Even traces of grease can reduce its lifetime.**
   Put the replacement tool onto the replacement bulb 7.



8. Press down the two spring levers 6 and insert the new bulb into the bulb socket 8.
9. To center the bulb, briefly press the spring levers 6 once more.

10. Carefully slide in the lamp carrier 2 into the housing 3 until it clicks into place.
NOTICE Do not leave the replacement tool inside the light source.



Info

How To - Replace the Halogen Bulb

This video tutorial shows how to replace the halogen bulb in the HAL 100 light source.

10.1.2 Adjusting the HAL 100

⚠ CAUTION

Eye injury due to light emission

Directly looking into emitted light can damage the eye.

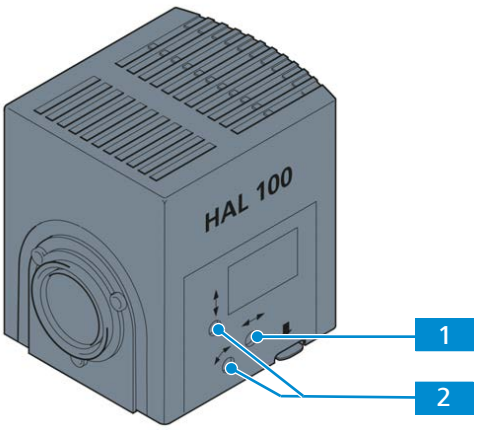
- Do not look into the light exit aperture of the light source.

Parts and Tools Screwdriver, 3.0 mm, ball head

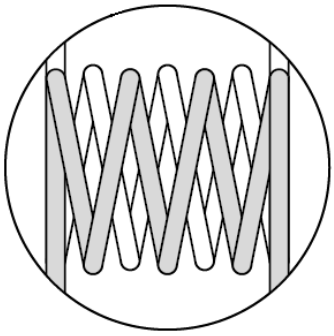
Procedure

1. Loosen clamping screw on the port.
2. Remove halogen lamp.
3. Switch on the microscope.
4. Direct light beam to a projection surface (wall) with a minimum distance of 3 m.

5. Set adjusting screw 1 so that both images of the lamp filaments are visible on the projection surface as sharply as possible.



6. Set adjusting screws 2 so that the lamp filament of one image exactly covers the gaps of the reflector image.



7. Attach halogen lamp to port.
8. Tighten clamping screw.

Info

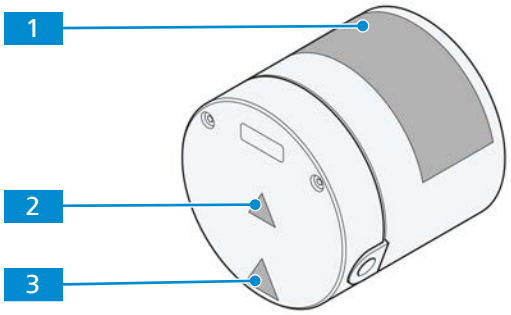
How To - Align the HAL 100

This video tutorial shows how to focus and align the HAL 100 light source.

10.2 microLED 3

The microLED 3 is an LED light source for transmitted light and reflected light microscopy applications.

10.2.1 Labels on the microLED 3 Light Source



Pos.	Label or light	Explanation
1		CAUTION Possible hazardous optical radiation emitted from this product. Do not stare at operating lamp. May be harmful to the eyes.
2		Hot surface! Do not touch.
3		LED radiation! Avoid exposure to radiation.

10.3 Assembling the Light Source for Reflected Light

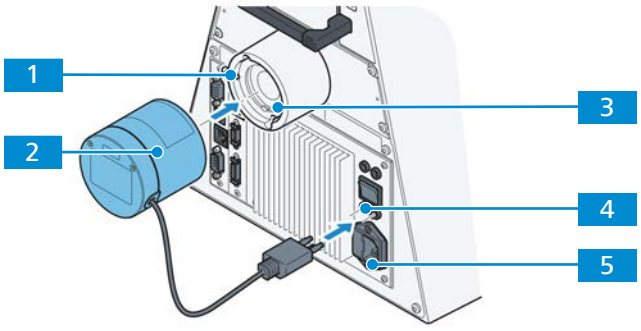


Fig. 33: Installing the light source for reflected light (RL)

1	Clamping screw	2	Light source
3	Illumination mount	4	RL Socket
5	Plug		

Parts and Tools
- Hex key, 3.0 mm

Prerequisite
- ✓ The microscope is switched off.
- ✓ The protective caps are removed (from the illumination mount of the stand and the light source).

Procedure
1. Loosen the clamping screw 1 at the illumination mount 3.
2. Insert the dovetail ring of the light source 2 into the illumination mount.
3. Fasten the clamping screw.
4. Insert the plug 5 into the transmitted light socket on the rear side of the stand 4 or into the external power supply.

10.4 Assembling the Light Source for Transmitted Light

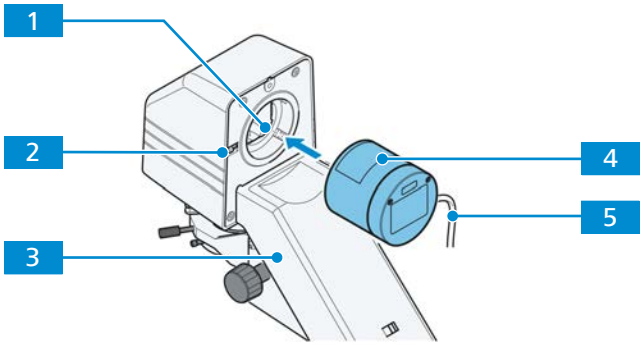


Fig. 34: Installing the light source for transmitted light (TL)

1	Illumination mount	2	Clamping screw
3	Carrier for transmitted light illumination	4	Light source
5	Cable of light source		

Parts and Tools
- Hex key, 3.0 mm

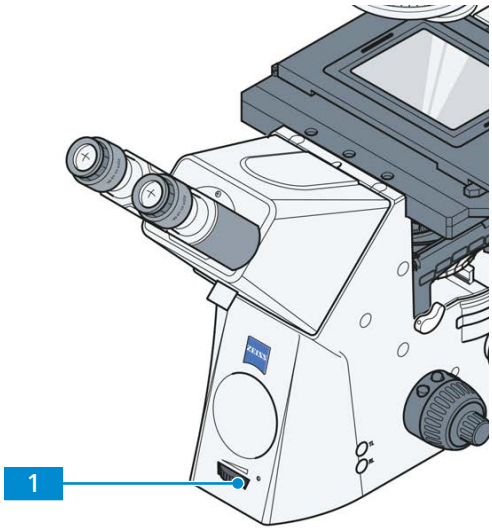
Prerequisite
- ✓ The microscope is switched off.
- ✓ The protective caps are removed (from the illumination mount of the stand and the light source).

Procedure
1. Loosen the clamping screw 2 at the illumination mount 1.
2. Insert the dovetail ring of the light source 4 into the illumination mount.
3. Fasten the clamping screw.
4. Insert the plug of the cable 5 into the transmitted light socket on the rear side of the stand or into the socket.

10.5 Adjusting the Illumination Intensity

Prerequisite ✓ The microscope is switched on and ready for operation.

Procedure 1. Turn the illumination intensity control wheel 1 to the left or right.



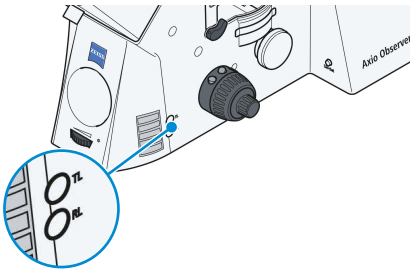
→ An acoustic signal sounds when the maximum intensity setting is reached. The rotation of the control wheel is not limited by a stop.

10.6 Switching On the Light Source

Prerequisite ✓ The light source (TL and/or RL) is assembled.

✓ *The microscope is switched on [▸ 75]*.

Procedure 1. Short press (<1 s) the **TL** or **RL** button.



→ The illumination is switched on.

→ The shutter for TL/RL illumination (if installed) opens.

10.7 Troubleshooting for Light Sources

Symptom	Measure
Halogen lamp flickers, illumination intensity is not stable	▪ *Exchange halogen lamp 12 V, 100 W [▸ 59]*. ▪ Connect the power plug to an appropriate power outlet. ▪ Insert the pins of the halogen lamp correctly.
The halogen lamp does not function although the on / off switch is set to "on".	▪ Connect the power plug to an appropriate power outlet. ▪ Connect the power plug to an appropriate power outlet. ▪ *Exchange halogen lamp 12 V, 100 W [▸ 59]*. ▪ *Exchange halogen lamp 12 V, 100 W [▸ 59]*. ▪ *Exchange the fuses [▸ 90]*. ▪ Contact your local ZEISS service representative.
The image is too bright	▪ *Set the illumination intensity [▸ 65]* of the used light source to an appropriate level.
The image is invisible/ dark	▪ Check if the power plug is plugged correctly. ▪ Connect the power plug to an appropriate power outlet.
The image is not a fluorescent image	▪ Check if the right light source is selected.

11 Light Manager Function

Purpose The Light Manager generate sample-dependent optimum illumination settings for the various contrast techniques and magnifications used, and to save these temporarily or permanently so that the user is able to reproduce these settings.

Function The Light Manager has three operating modes: OFF, CLASSIC and SMART. The precise function of each mode depends on certain optional stand components. Use of the Light Manager requires encoded components e.g. nosepiece, condenser. This allows the stand electronics to detect when the nosepiece is rotated into a new position.

11.1 Light Manager Operating Modes

Classic Mode For each magnification (each combination of objective and optovar) the optimum illumination settings can be selected. The illumination must be set for all contrast techniques used for each objective.

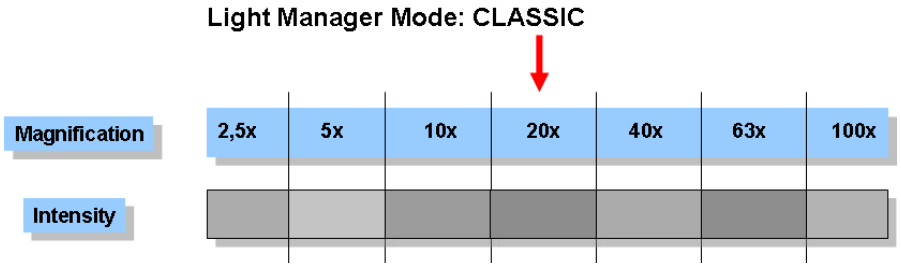


Fig. 35: Light Manager Mode: Classic

Smart Mode The Light Manager automatically calculates the optimum brightness for all objectives configured for a given contrast technique.

For a given contrast technique: when the illumination intensity is changed for one objective, the correct illumination intensity will be calculated for all other objectives based on the magnification. This will then be adjusted when the objective is changed. The optovar turret, if used, will also be considered in the brightness calculation.

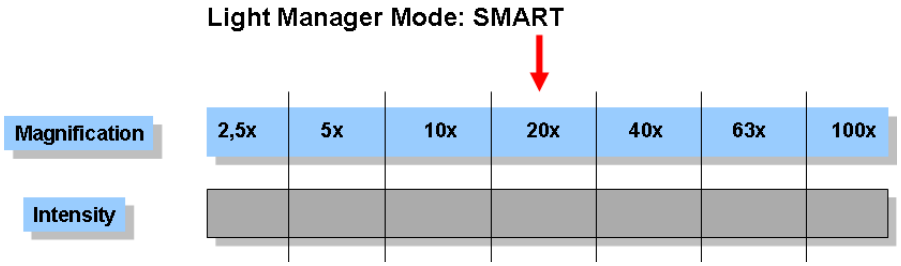


Fig. 36: Light Manager Mode: Smart

Off Mode If the Light Manager is switched off, the microscope operates like a conventional light microscope.

Starting from a selected magnification and an appropriate lamp voltage, the voltage must readjust manually to obtain a comparable brightness with a higher or lower magnification.

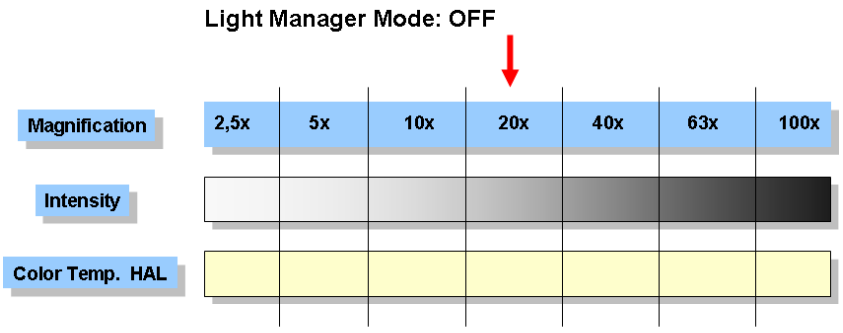
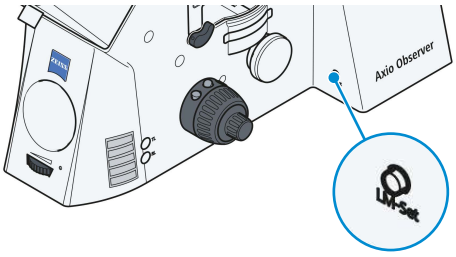


Fig. 37: Light Manager Mode: Off

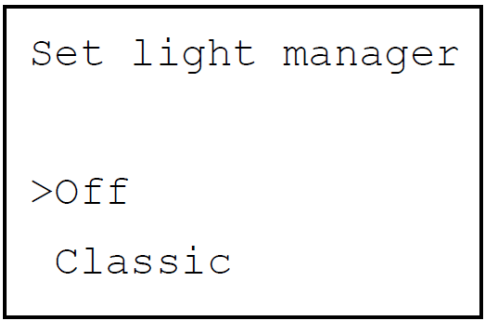
11.2 Switching On the Light Manager

Procedure

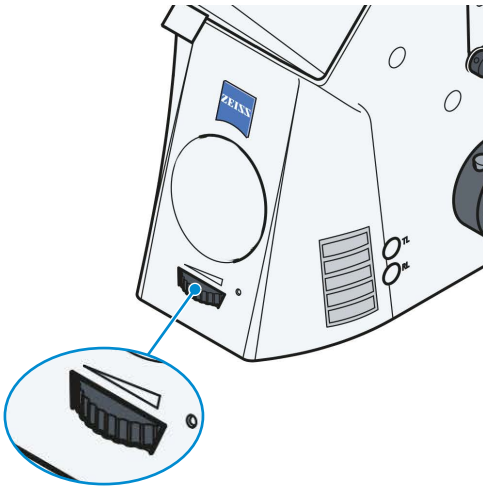
1. Press and hold down the LM-Set button for > 2 s to start the *configuration mode [▸ 72]*.



2. Press the **LM-Set** button briefly (< 1 s, no beep) till **Set light manager**.



3. Select the *Light Manager Operating Mode [▸ 67]* by rotating the illumination intensity control wheel until the required setting is displayed.



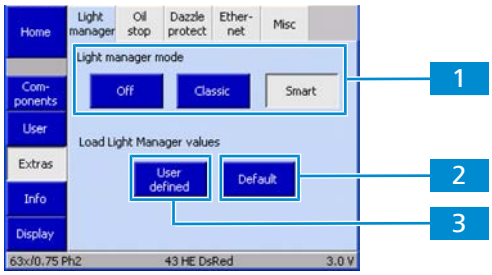
4. Press and hold the **LM-Set** button for > 2 s to exit configuration mode.
   → Two beeps indicates that the system is switching from the configuration mode to operating mode.

11.3 Selecting the Light Manager Mode on the TFT Display

Prerequisite ✓ Axio Observer 7 or Axio Observer 7 materials

Procedure

1. On the TFT display, select **Home > Settings > Extras > Light Manager**.



   → The **Light Manager** tab appears on the screen.

2. Press **Off**, **Classic** or **Smart** 1 to select the Light Manager operating mode.
3. Press **User defined** 3, if temporary Light Manager values must be reset to the last settings made using the **LM-Set** button.
   → The temporary settings are discarded and the permanently saved settings are set as active.
4. Press **Default** 2, if the manufacturer's default settings are to be used instead.
   → The default values will be loaded, written to the temporary memory and set as active.
5. If standard settings are to be used permanently, press the **LM-Set** button to write them to the permanent memory.
   → It is not possible to overwrite the manufacturer's default settings.

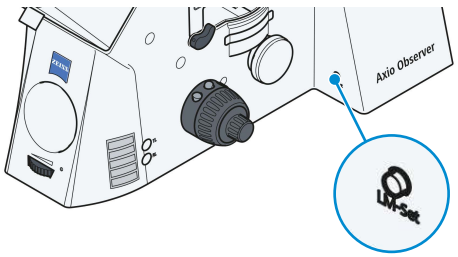
11.4 Saving the Light Manager Values

> **Info**
> The relevant values are automatically stored in Light Manager's temporary memory when the objective is changed.

Prerequisite ✓ The microscope is operational.

Procedure

1. Select the required magnification.
2. Select the required light intensity.
3. Press the **LM-Set** button for at least 1.5 seconds.



   → A beep will be emitted to confirm that the settings have been permanently saved. This will be followed approx. 3 seconds later by a second beep.
4. Repeat the procedure to set the light intensity values for further components.

↳ The light intensity values for all configured components are saved.

↳ After switching on the microscope, the previous setting of the Light Manager will be restored.

12 Installation

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

12.1 First Set Up of the Axio Observer

Procedure

1. *Unpack the microscope [▸ 70]*.
2. Optional: *Assemble the Transmitted Light Illumination Carrier [▸ 25]*.
3. *Assemble the tube [▸ 33]*.
4. *Insert and adjust the eyepieces [▸ 35]*.
5. *Assemble objectives [▸ 38]*.
6. *Assemble the condenser [▸ 42]*.
7. Assemble and adjust the *stage [▸ 45]*.
8. Assemble the *illumination unit [▸ 59]*.
9. *Wire the microscope [▸ 71]*.
10. Install additional *accessories or components [▸ 107]*.

12.1.1 Unpacking the Microscope

⚠ CAUTION

Muscle strains and back injuries due to heavy weight

The microscope is heavy. Wrong handling, e.g. lifting alone, might lead to injuries or damage the microscope.

- Organize an assistance for transportation.
- Only transport the microscope over short distances, i.e. within the same building.
- Use the supplied grip holders for lifting or transporting the microscope.
- Do not attempt to grab the microscope anywhere else for lifting or transporting the microscope.
- Transport of the microscope over long distances may only be performed by the ZEISS service representative.

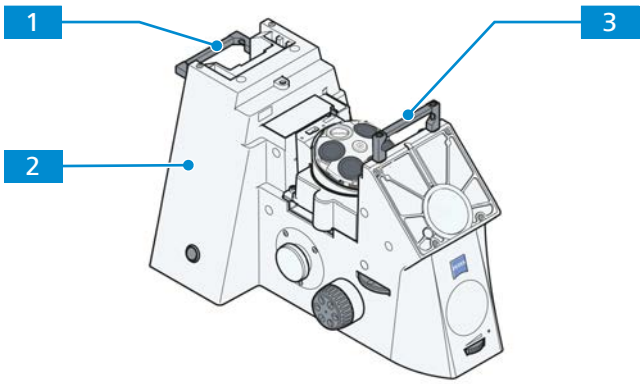


Fig. 38: Unpacking the microscope

1	Grip holder, rear	2	Stand
3	Grip holder, front		

Parts and Tools
- Hex key, 4.0 mm
- Plastic cover [2x]

Procedure
1. Open the packaging.
2. Take the microscope, all assemblies, and accessories out of the packaging.
   NOTICE **Use the dedicated grip holder to lift and transport the stand.**
3. Check them for completeness as per delivery note.
4. Check all parts for damaging.
5. Place the microscope on a vibration-free, level, and non-inflammable surface.
6. Remove the two fixing screws from the front grip holder 3.
7. Remove the front grip holder 3.
8. Close the holes on the stand with the plastic covers.

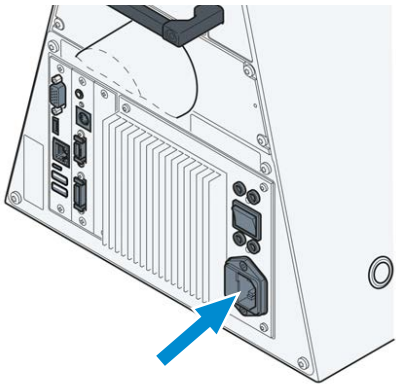
It is recommended to keep the original packing and store it away for later use, e.g. for stowing the microscope during periods of non-use or for returning the microscope to the manufacturer for repair.

12.1.2 Wiring

12.1.2.1 Wiring the Microscope to the Mains

Prerequisite
- ✓ The microscope is switched off.

Procedure
1. Insert the connector of the power cord into the power socket at the rear side of the microscope.

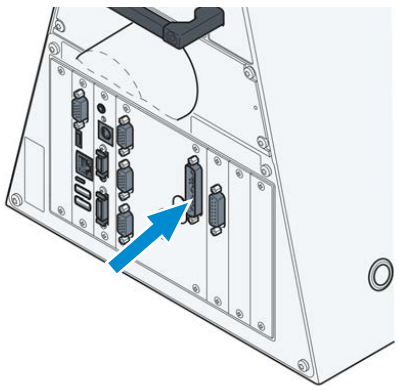


2. Insert the opposite connector of the power cord into the operation site's power outlet.

12.1.2.2 Wiring the Microscope to the Mains Via External Power Supply Unit

Prerequisite
- ✓ The microscope is switched off.

Procedure
1. Insert the power supply cable of the power supply unit into the corresponding socket at the microscope connector panel.



2. Insert the power supply cable into the power outlet.

12.1.3 Configuration Mode

Info

During configuration, when a position (nosepiece and reflector turret) or a setting is changed, the settings are saved temporarily. Changes are only saved permanently when configuration mode is exited. Some changes require a system reset before taking effect.

Function Basic settings for various hardware components can be set in configuration mode. Following menu options 1 are available: **Set Objective** (nosepiece), **Set ReflModule** (reflector turret), **Set RL Slider** (slider for the reflected light illuminator aperture), **Set Lamp Output** (illuminator power), **Set Ext. Shutter**, **Set Light Manager**, **Set Dazzle Protection**

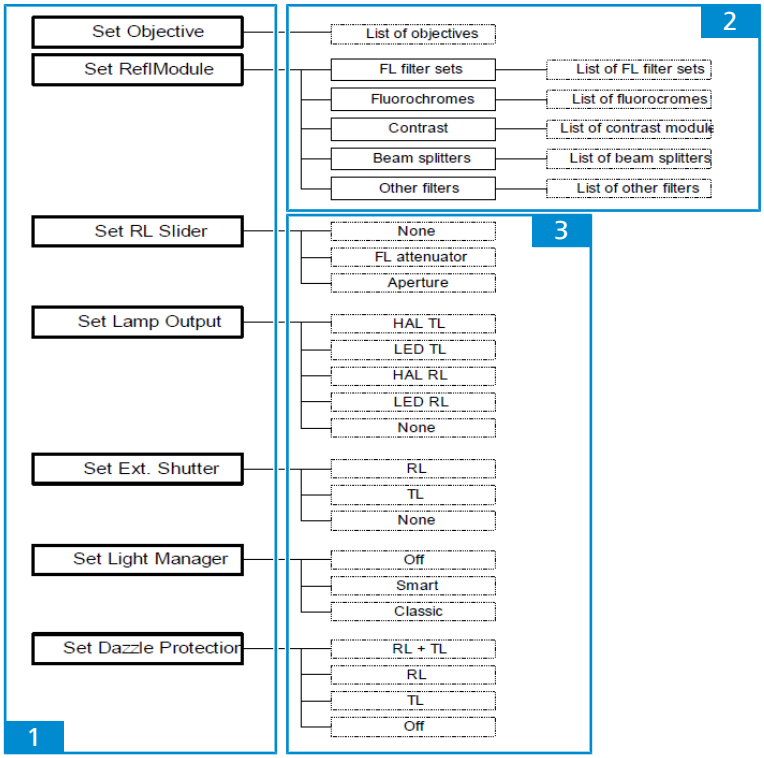


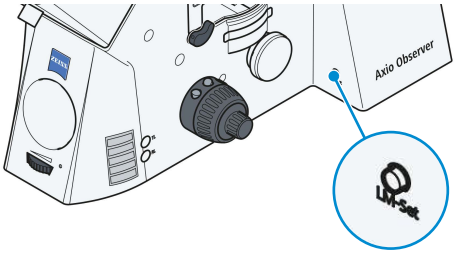
Fig. 39: Configuration mode

Info

If a component is not available (cannot be configured), the relevant menu will not be displayed. The current component position is shown on the right next to the menu designation.

Procedure

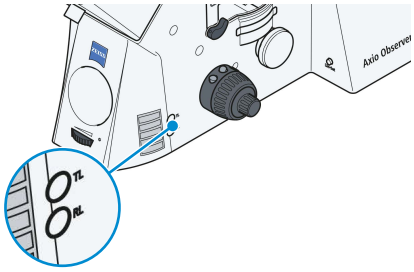
1. Press and hold down the **LM-Set** button for > 2 s.



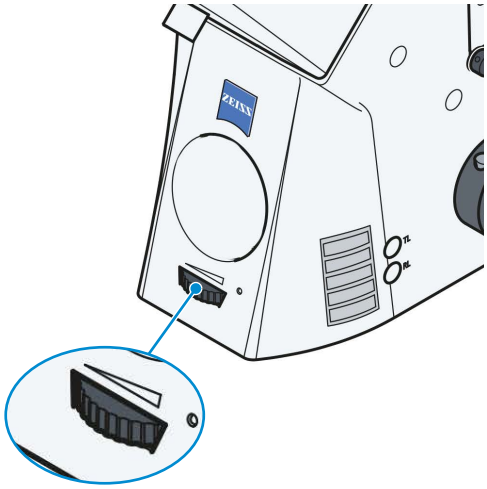
→ Two beeps indicates that the microscope has switched to configuration mode.

2. Press the **LM-Set** button briefly (< 1 s, no beep) to switch through the menu 1 (loop).

3. Press the **TL** (next) or the **RL** (previous) button to select the submenus 2.



4. Make the required settings in the menus.
5. Turn the illumination intensity control wheel to scroll through the selected menu 3.

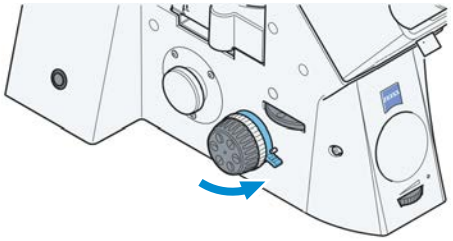


6. Make the required settings in the menus.
7. Press and hold the **LM-Set** button for at least 2 s to exit the configuration mode.
   → Two beeps indicates that the microscope is exiting configuration mode.
   → The LCD returns to status display mode.

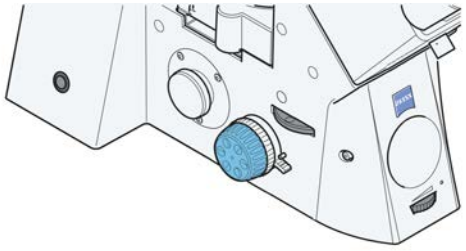
12.1.4 Adjusting the Vertical Stop/Upper Limit for the Focusing Knob

Procedure

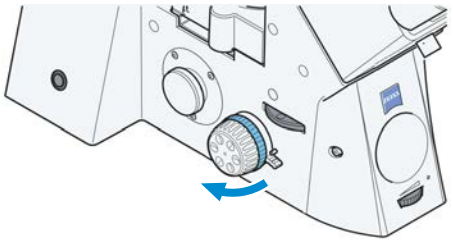
1. Rotate the clamping lever upwards to the stop pin.



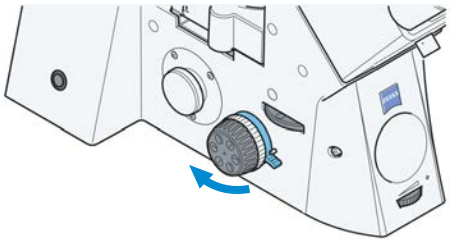
2. Carefully, move the nosepiece to the required upper position without colliding to the stage or sample.



3. Rotate the knurled wheel clockwise as far as it will go.



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



12.2 CAN Distributer Box

The CAN distributor box can be used to connect the maximum number of CAN components to the stand.

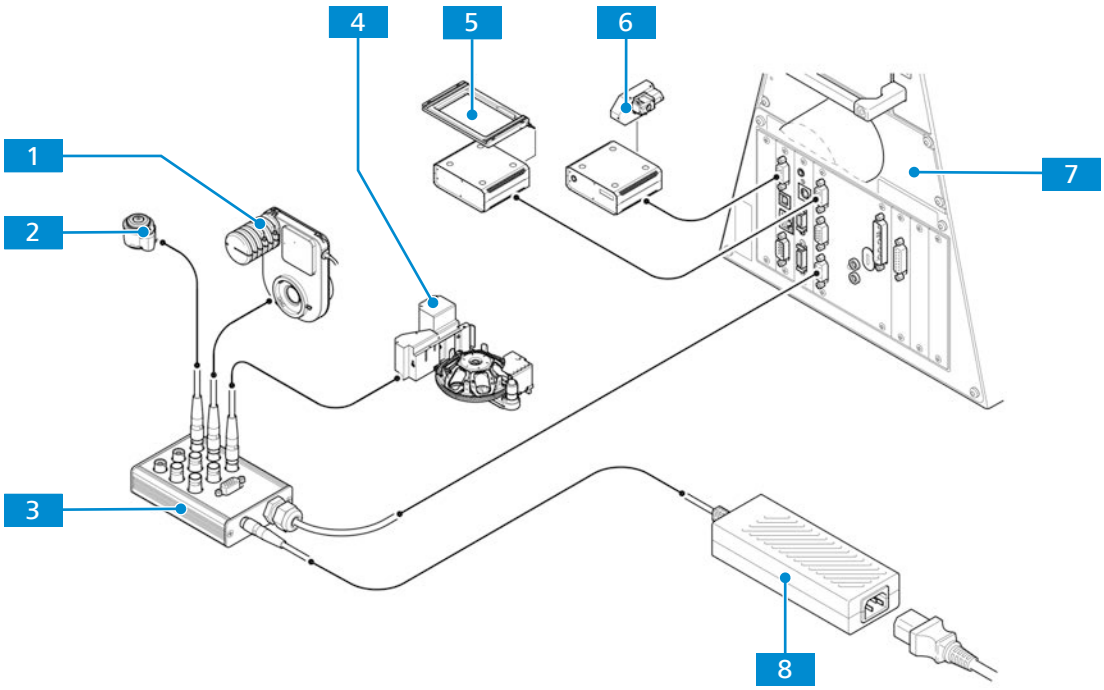


Fig. 40: Connection of CAN Components

1	External filter wheel excitation 8-pos. mot.	**2**	Objective autocorr
3	CAN distributor box	**4**	Dual filter wheel mot. for beam splitting and emission
5	Stage attachment Z-PIEZO WSB 500 with controller	**6**	Definite Focus.2 module with Focus Controller.2
7	Stand, rear side	**8**	Desktop power supply unit

13 Operation

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

Info

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

Info

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

13.1 Prerequisites for Commissioning and Operation

The following basic prerequisites are necessary for commissioning and operation:

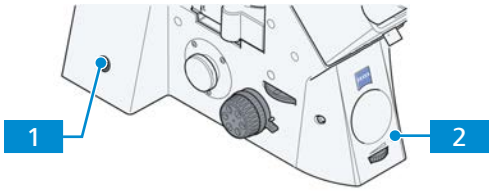
- This document was read prior to commissioning or operation and kept for further use.
- The chapter **Safety** was read and understood.
- The operator is acquainted with the general Windows-based programs.
- If required: Basic training and safety briefing were successfully completed.

13.2 Switching On the Axio Observer

Prerequisite ✓ The microscope is connected to the mains.

Procedure

1. Press the STANDBY button 1.

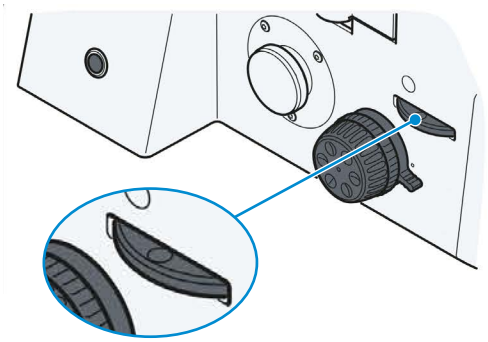


   → The Power LED 2 lights up.
   → After switching on, the microscope is initialized.
2. Optional: Switch on the power supply for the external light sources.

13.3 Selecting the Beam Path

Procedure

1. Rotate the beam path selector wheel to choose the visual observation.



Configuration	Sym-bol	Visual observation	Port observation
L100 (left sideport) R100 (right sideport)		100 %	0 % left and right sideport
		0 %	100 % left sideport
		0 %	100 % right sideport
L80 (left sideport) R100 (right sideport)		100 %	0 % left and right sideport
	80	20 %	80 % left sideport
		0 %	100 % right sideport
R100 (right sideport) R50 (right sideport)		100 %	0 % left and right sideport
		0 %	100 % right sideport
	50	50 %	50 % right sideport
L100 (left sideport) R80 (right sideport)		100 %	0 % left and right sideport
		0 %	100 % left sideport
	80	20 %	80 % right sideport

13.4 Focusing the Sample

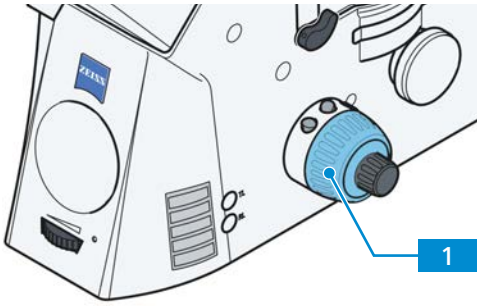
Prerequisite

✓ The microscope is switched on and ready for operation.

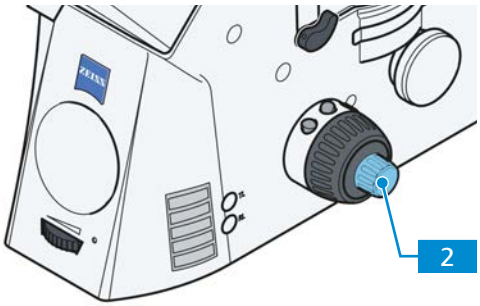
✓ Illumination and contrast techniques are set.

Procedure

1. Select the lowest magnification (e.g. 5 x).
2. Look through the eyepieces.
3. Turn the big focusing knob for coarse adjustment 1.



4. Turn the small focusing knob for fine adjustment 2.



5. Select a higher magnification to view the sample in more detail.

13.5 Setting Up for Transmitted Light Contrast Techniques

13.5.1 Setting Up for Transmitted Light Brightfield (Köhler)

Info

How To - Set up Köhler Illumination

This video tutorial shows how to set up the Köhler illumination with simple steps.

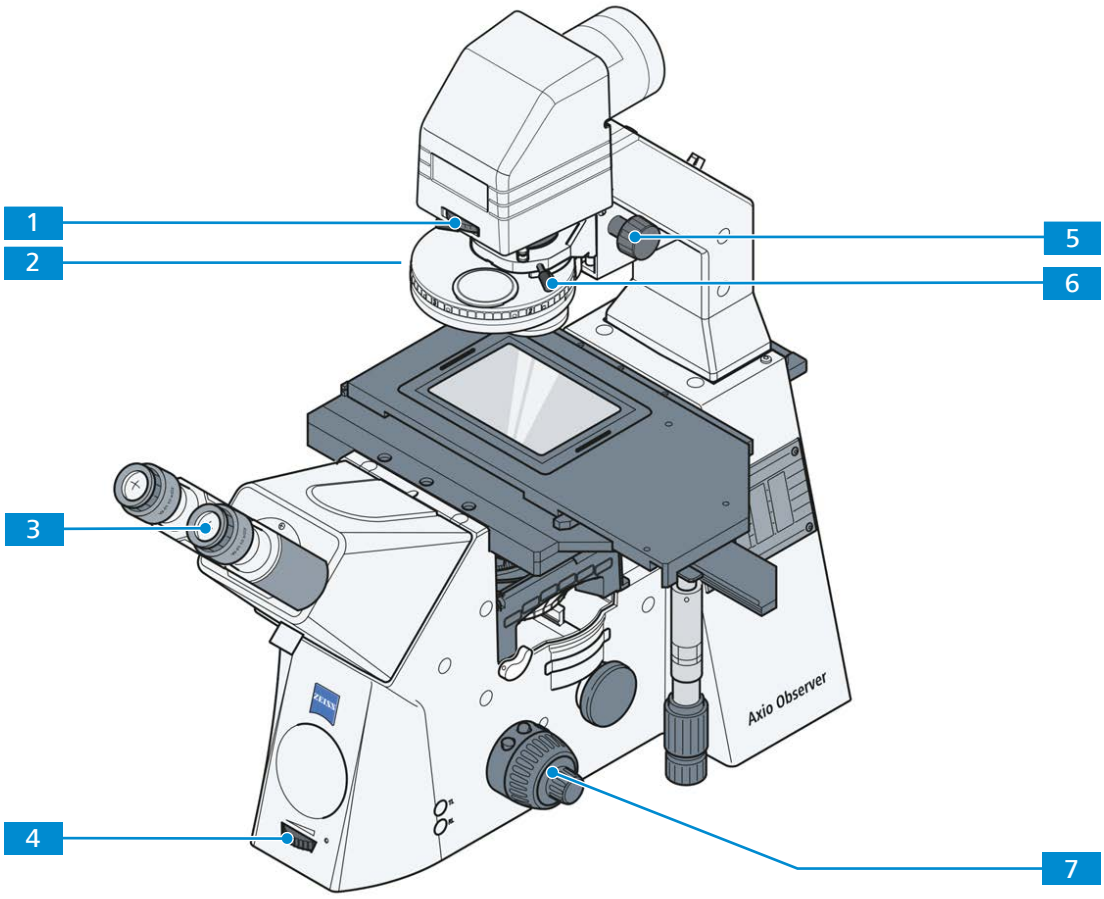


Fig. 41: Köhler illumination

1	Luminous-field diaphragm	2	Aperture stop
3	Eyepiece	4	Illumination intensity control wheel
5	Condenser adjustment knob	6	Condenser centering screw (2x)
7	Focusing knob		

Parts and Tools

- High-contrast sample

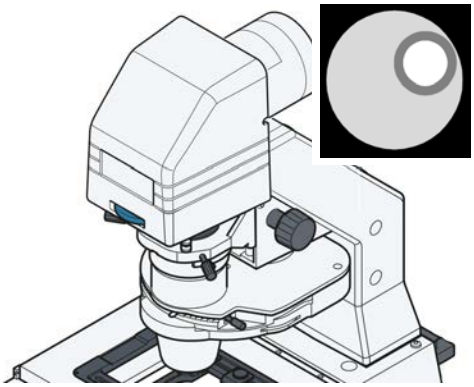
Prerequisite

- ✓ The microscope is switched on and ready for operation.
- ✓ The objective with the lowest magnification (e.g. 10x) is selected.

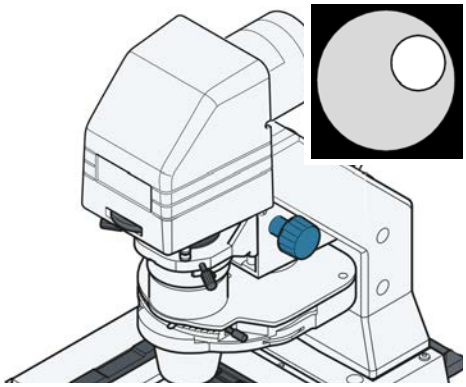
Procedure

1. Open the luminous-field diaphragm 1 completely.
2. Open the aperture stop 2 completely.
3. Set condenser to brightfield position.
4. Move condenser vertically to a ± middle position using the condenser height control 5.
5. *Focus sample [▸ 77]* 7. **Info** **Keep sample in focus during the whole alignment procedure.**
6. Set the *light intensity [▸ 65]* 4 to a comfortable level.

7. Close luminous-field diaphragm 1 until it appears in the field of view.

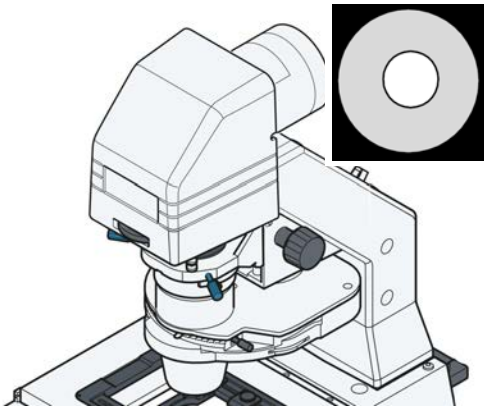


8. Focus the luminous-field diaphragm image by lowering the condenser with the condenser adjustment knob 5.

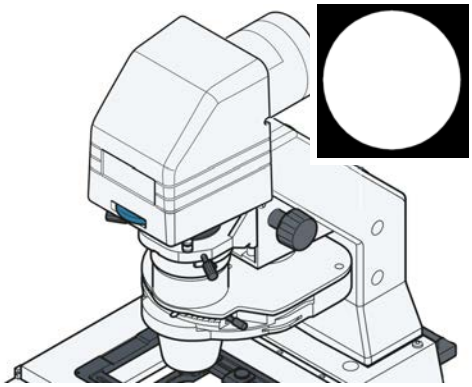


→ Now, the edges of the luminous-field diaphragm appear with maximum sharpness.

9. Center the luminous-field diaphragm image with the condenser centering screws 6.

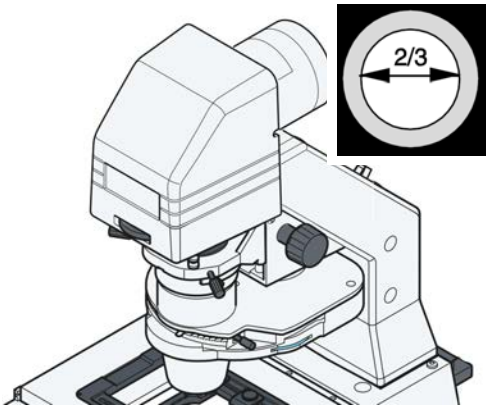


10. Open the luminous-field diaphragm 1 until the edge of the diaphragm disappears from the field of view.



11. Remove an eyepiece 3 from the tube to adjust the aperture diaphragm (contrast).
12. Look into the tube with the naked eye.

13. Set the aperture stop 2 to 2/3 - 4/5 of the diameter of the exit pupil of the objective.



14. Reinsert the eyepiece 3 into the tube.
15. Remove the high-contrast sample.

13.5.2 Setting Up for Transmitted Light Phase Contrast Microscopy

Parts and Tools

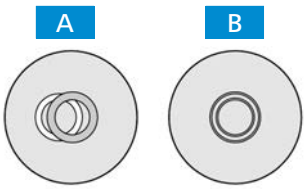
- Auxiliary microscope

Prerequisite

- ✓ The microscope is switched on and ready for operation.
- ✓ Phase contrast objectives with the phase rings **PhC 1**, **PhC 2** or **PhC 3** are *installed [▸ 38]*.
- ✓ Condenser with modulator disk with centerable ring diaphragms **PhC 1**, **PhC 2** and **PhC 3** is installed.

Procedure

1. Swivel the phase contrast objective into the beam path (e.g. **Ph1**).
2. Swivel in the annular phase diaphragm on the condenser's revolver disk with the same labeling as the objective (e.g. **Ph1**).
3. Replace one eyepiece with an auxiliary microscope.
4. With the adjusting fixture on the auxiliary microscope, focus the annular phase diaphragm and the phase ring in the objective exit pupil.
5. Check the centering and the overlap of the lighter annular phase diaphragm (in the condenser) with the darker phase ring (in the objective).



   → Both rings must be centered and overlapping B.
6. If the overlap is not exact A, *recenter [▸ 43]* the lighter annular phase diaphragm.
7. Remove the auxiliary microscope and replace the eyepiece.

> **Info**
>
> All phase contrast objectives used require adjustment of the phase plates. When examining liquid objects in small vessels, the optical path must be aligned to the center of the vessel, as liquids at the edge of a vessel act as a lens and adversely affect the microscope image.

13.6 Setting Up for Reflected Light Contrast Techniques

13.6.1 Setting Up for Reflected Light Brightfield Microscopy

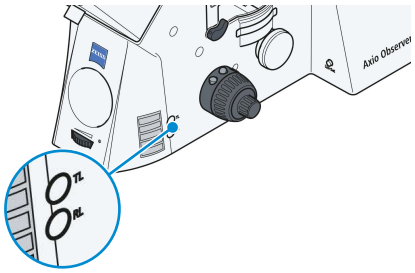
Parts and Tools
- High-contrast sample

Parts and Tools
- Objective EC Epiplan
- Objective EC Epiplan-Neofluar

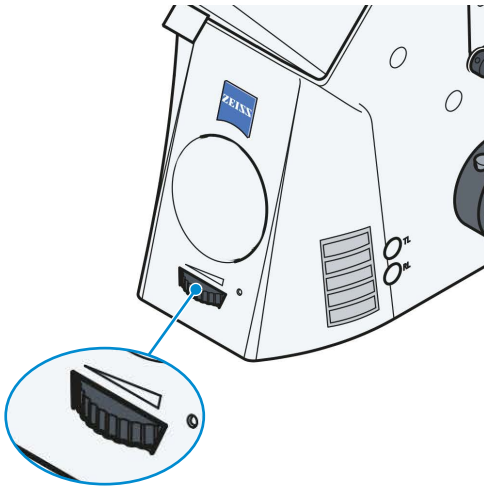
Prerequisite
- ✓ A light source for reflected light is installed and adjusted.
- ✓ A P&C brightfield reflector module for reflected light is installed.
- ✓ The microscope is switched on and ready for operation.

Procedure

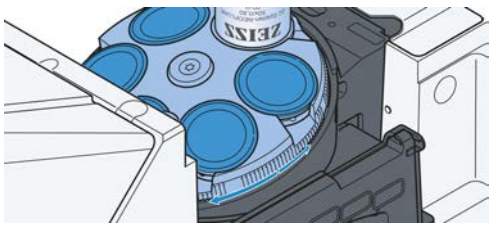
1. Press the **RL** button to switch on the light source.



2. *Set the light intensity [▸ 65]* to a comfortable level.

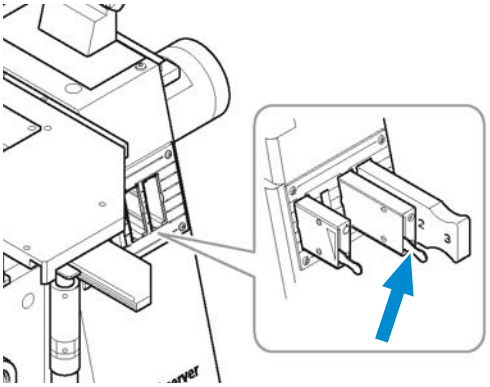


3. Place a high contrast reflected-light sample on the microscope stage.
4. Swivel in the objective with the lowest magnification on the nosepiece, ensure that it clicks into position correctly.

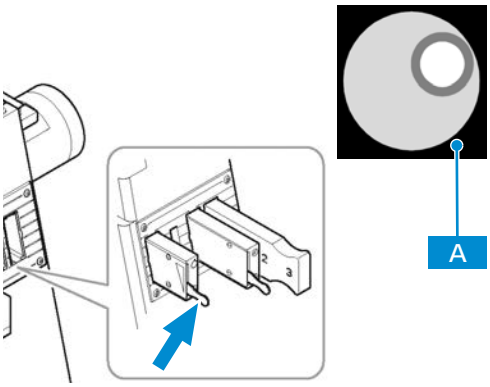


5. *Focus sample [▸ 77]*. **Info** **Keep sample in focus during the whole alignment procedure.**

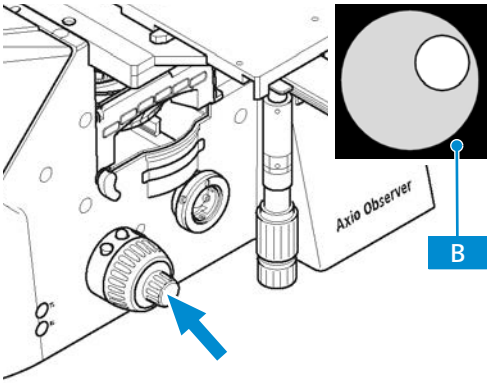
6. Move the aperture stop slide MAT control lever into the central position (roughly half opened or closed).



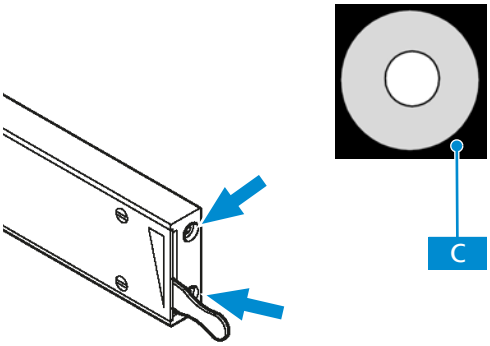
7. Close the luminous-field diaphragm until it is visible (even if not in focus) in the field of view A. Use the control lever of luminous-field diaphragm slider.



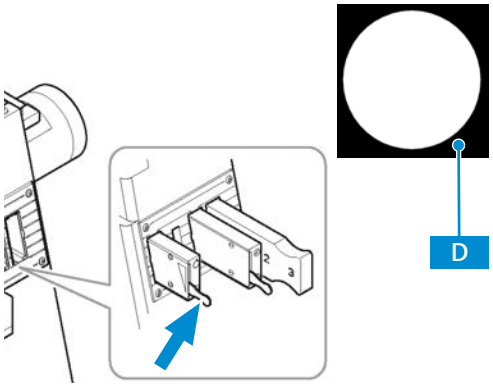
8. Bring the edge of the luminous-field diaphragm into focus B. Use the focusing knob.



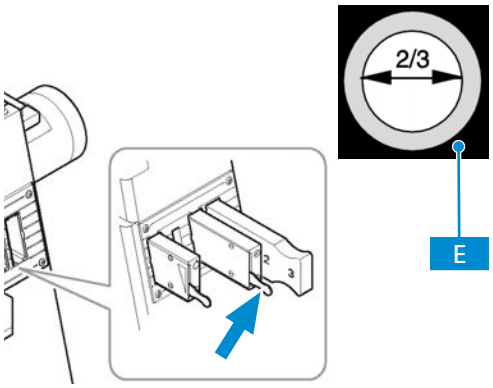
9. Center the luminous-field diaphragm C. Use the centering screws of the luminous-field diaphragm slider.



10. Open the luminous-field diaphragm until the edge of the diaphragm just disappears from the field of view D. Use the control lever of luminous-field diaphragm slider.



11. Remove an eyepiece from the tube to adjust the aperture diaphragm (contrast).
12. Look into the tube with the naked eye.
13. Set the aperture diaphragm to between 2/3 - 4/5 of the diameter of the exit pupil of the objective E. Use the control lever of aperture diaphragm slider.



14. Reinsert the eyepiece into the tube.
15. Remove the high-contrast sample.

↳ The illumination is now adjusted according to the KÖHLER method.

Info

Never use the aperture stop to adjust image brightness. Use the illumination intensity control for this purpose!

13.6.2 Setting Up for Reflected Light Darkfield Microscopy

Parts and Tools

- Objective EC Epiplan
- Objective EC Epiplan-Neofluar

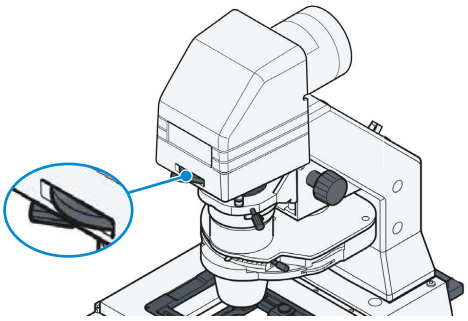
Prerequisite

- ✓ An ACR P&C dark reflector module for reflected light is installed.
- ✓ A light source for reflected light illumination is installed and adjusted, if required.
- ✓ The microscope is switched on and ready for operation.

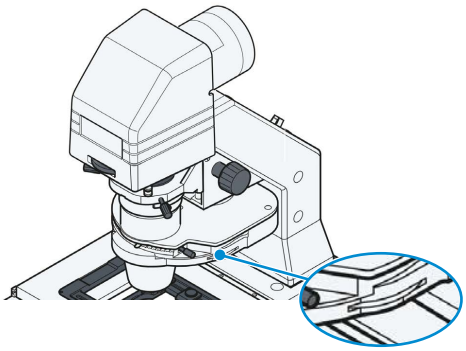
Procedure

1. Adjust the microscope for *reflected light brightfield [▸ 81]*.
2. Rotate the ACR P&C darkfield reflector module on the reflector turret into the beam path.
3. Swivel in the position with the darkfield (HD) objective on the nosepiece.

4. Completely open the luminous field diaphragm.



5. Completely open the aperture stop.



6. Switch off or remove neutral filters if applicable.
7. *Focus sample [▸ 77]*. **Info** **Keep sample in focus during the whole alignment procedure.**

13.6.3 Setting Up for Reflected Light Fluorescence Microscopy

Parts and Tools

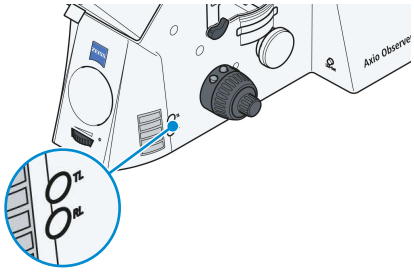
- Strongly fluorescing sample
- Objective for Fluorescence

Prerequisite

- ✓ A reflected light fluorescence illuminator is installed and adjusted.
- ✓ A P&C FL reflector module for reflected light fluorescence is installed or the FL filter set fitted in dual filter wheel mot. and the filter wheel excitation 8-pos. mot. is installed.
- ✓ The light source for transmitted light illumination is installed. If no transmitted light is available, the switching mirror for two illuminators is necessary, equipped with a light source and the fluorescence illuminator.
- ✓ A further iris diaphragm slider for slot A is available.
- ✓ The microscope is switched on and ready for operation.

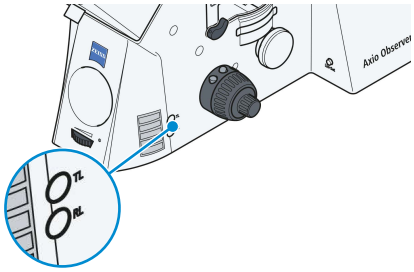
Procedure

1. Search for the sample in the *reflected light brightfield [▸ 81]* or transmitted light brightfield.
2. Switch the beam path from the light source (TL) to the fluorescence illuminator in reflected light.
3. If in use, replace the aperture stop slider MAT by the iris diaphragm slider in slot A.
4. Press the **RL** button to use the internal fluorescence shutter to keep the beam path in the reflected light section closed.



5. Switch on the fluorescence illuminator and leave to warm up to operating temperature for approx. 15 minutes.

6. On the reflector turret or the virtual reflector turret (if dual filter wheel mot. is available), select the desired fluorescence filter combination (depending on the desired kind of excitation) and switch on.
7. Press the **RL** to open the internal fluorescence shutter.



8. *Insert one iris diaphragm slider into the luminous-field diaphragm F slot until it clicks into place [▸ 137]*.
9. Close the diaphragm until it becomes visible in the field of view. Using the lever of the diaphragm slider.
10. Center the diaphragm using the two adjusting screws on the slider.
11. Open the diaphragm until the entire field is clear.
12. Insert the centered slider into the slot A for the aperture diaphragm until it clicks into place.
13. Insert a further iris diaphragm slider into the luminous-field diaphragm slot F.
14. Close the luminous-field diaphragm until it becomes visible in the field of view.
15. Center the luminous-field diaphragm F to the edge of the field of view using the two centering screws.
16. Either open the luminous-field diaphragm until it just disappears from the edge of the field of view.
17. If there is a risk of bleaching the sample, close it until it is visible in the field of view.
18. Refocus on the sample.
19. If the HBO 100 and the short-wave excitation reflector module are used, use the knurled knob on the HBO 100 to set the collector so that the field of view is illuminated as evenly as possible.
    → When long-wave excitation modules are used, no correction of the collector position is required.

13.6.4 Setting Up for Reflected Light Polarization Microscopy

Info

Only available for Axio Observer 5 materials.

Parts and Tools

- Objective for Pol

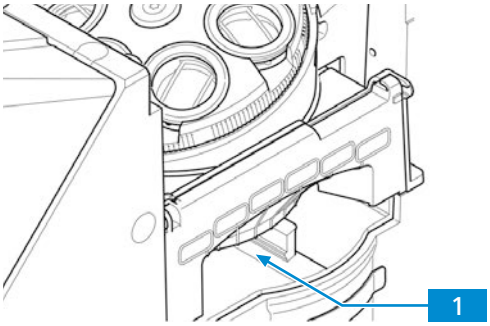
Prerequisite

- ✓ The microscope is equipped with a reflected light illuminator HD POL FL.
- ✓ A DIC/Pol P&C or Pol P&C reflector module for reflected light is installed.
- ✓ The light source for reflected light illumination is *installed [▸ 63]* and adjusted.
- ✓ The fixed analyzer slider or the polarizer slider RL 6x30, 90° rotatable is available. Alternatively, the reflector module analyzer for reflected light is installed in the reflector turret.
- ✓ The microscope is switched on and ready for operation.

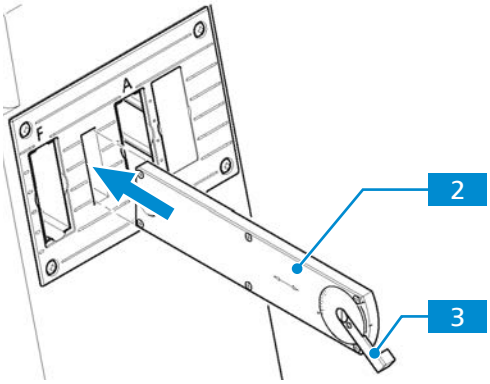
Procedure

1. Adjust the microscope for *reflected light brightfield [▸ 81]*.
2. If inserted, remove DIC slider.
3. Set the desired magnification.

4. Swivel reflector module DIC/Pol P&C or Pol P&C on the reflector turret into the beam path and insert the analyzer slider 1.



5. Alternatively, insert the analyzer slider (or swivel in the reflector module analyzer on the reflector turret) and insert the polarizer slider (rotatable) 2 into the slot.



6. *Focus the sample [▸ 77]*.
7. If the polarizer slider (rotatable) is used, adjust the desired contrast using the lever 3.
   → There is often an interplay of color a few degrees before or after the 0° position.

13.6.5 Setting Up for Reflected Light TIC Microscopy

Parts and Tools

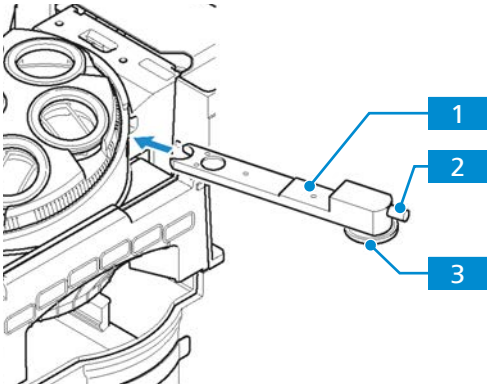
- Objective for DIC with compatible DIC slider
- Objective for Pol

Prerequisite

- ✓ A C-DIC/TIC P&C reflector module for reflected light is installed.
- ✓ The light source for transmitted light illumination is installed and adjusted, if required.
- ✓ The TIC slider (in combination with reflector module C-DIC/TIC P&C) is available.
- ✓ The microscope is switched on and ready for operation.

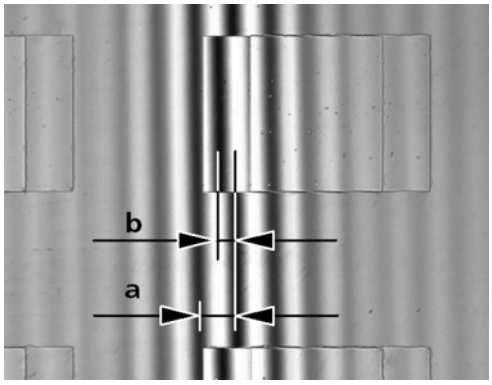
Procedure

1. Adjust the microscope for *reflected light brightfield [▸ 81]*.
2. Swivel the reflector module C-DIC/TIC P&C on the reflector turret into the beam path.
3. Insert the TIC slider 6x20 1 into the slot.



   → Chromatic interference stripes appear in the field of view.
4. Move the black interference stripe by sight to the middle of the field of view. Use the setting screw 2 on the TIC slider.

5. To choose the structure to be measured, turn the setting wheel 3 on the TIC slider until the interference stripes are vertical to the direction in which the sample is broken down.

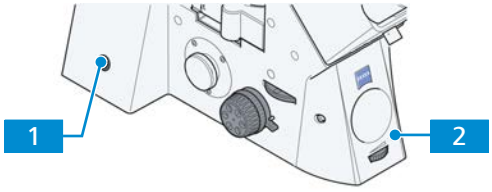


6. Determine the values for **a** (distance between the interference stripes) and **b** (offset of the interference stripes along the step) in the interference image. Use an eyepiece reticle micrometer or a micrometer eyepiece.

13.7 Switching Off the Axio Observer

Procedure

1. Press the STANDBY button 1.



→ The Power LED 2 turns off.

2. Optional: Switch off the power supply for the external light sources.

14 Care and Maintenance

To ensure the best possible performance of the microscope and its components, maintenance must be performed on a regular basis. Keep the service logs of the microscope.

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

Info

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

Info

Contact the ZEISS service representative to learn more about the **ZEISS Predictive Service**.

14.1 Safety during Cleaning and Maintenance

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

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

⚠ DANGER

Electric injury due to live parts

Coming in contact with live parts can lead to electric shock or burn.

Prior to opening and cleaning:

- Pull the power plug for safe disconnection from the power supply.

NOTICE

Functional impairment due to dirt, dust and moisture

Dirt, dust, and moisture can impair the microscope and its components functionality and can cause short-circuits. Blocking or covering ventilation slots can lead to a build-up of heat that can damage the device and, in extreme cases, cause a fire.

- Use the dust protection cover if the microscope is not used.
- The ventilation slots must be unobstructed at all times and the heat sink (if available) must be unobstructed.
- Do not insert any objects or allow them to fall into the ventilation slots.
- 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 and its components.
- In case of damage, the affected parts of the microscope must be taken out of operation.

14.2 Maintenance Schedule

To ensure the best possible performance of the microscope and its components, maintenance must be performed on a regular basis. Keep the service logs of the microscope.

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

Interval	Part/Component	Activity
daily	Microsope	Check the power cord and the plug for possible damage. If any damage is observed, turn the microscope off and secure it against inadvertent restarts immediately. Call in a qualified professional to remedy the problem.
as required	Fuse	Exchange fuses. If fuses blow frequently, the cause for this must first be found and a possible technical fault must be properly rectified before replacing fuses.
as required	HAL 100 light source	The bulb is defective or used up. ▪ *Replace the bulb [▸ 59]*. ▪ *Adjust the HAL 100 light source [▸ 61]*.
as required	Cleaning/Surfaces	▪ Remove dust and loose particles from visible surfaces using brush, blower brush, cotton buds, optics cleaning cloth or cotton cloth. ▪ *Clean surfaces [▸ 91]*.

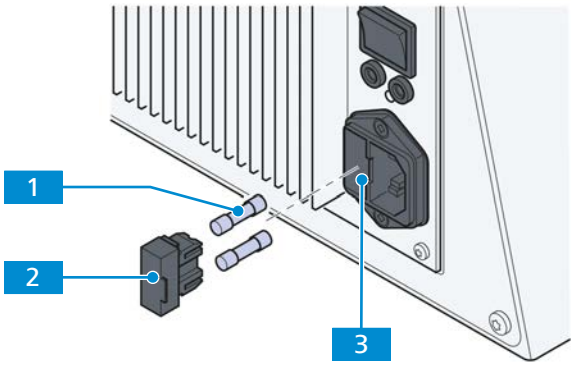
14.3 Maintenance Work

14.3.1 Exchanging Fuses

> **⚠ WARNING**
>
> **Fire Hazard due to wrong fuses**
>
> Fuses with the wrong fuse value can cause smoke or fire.
>
> - Only use fuses as specified.
> - Disconnect the power supply before cleaning or changing fuses.

14.3.1.1 Exchanging the Fuses in the Stand

> **⚠ DANGER**
>
> **Electric injury due to live parts**
>
> When the microscope and its components are still switched on, coming in contact with live parts can lead to electric shock or burn.
>
> - Switch off the microscope and its components prior to opening or cleaning.
> - Disconnect the microscope and its components from the mains.



1 Fuse (2x)
2 Fuse holder
3 Fuse box

Parts and Tools
- 2x Fuse type T 5.0A H 250V 5x20mm

Procedure
1. If the fuses fail, first check the cause and remedy technical problems properly.
2. Remove the fuse holder 2 by pulling it to the front. Use a small screwdriver for this purpose if necessary.
3. Remove the fuses 1 from the fuse holder and replace with new fuses.
4. Push the fuse holder back into the fuse box 3 until it engages.

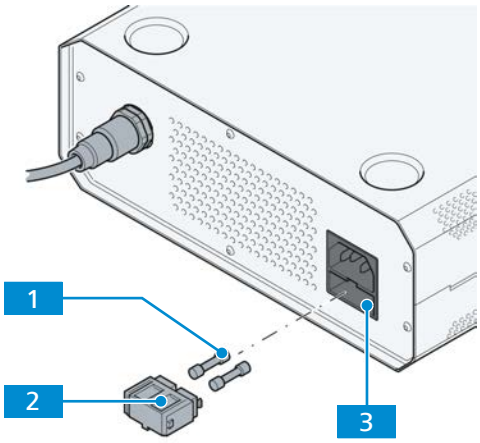
14.3.1.2 Exchanging the Fuses in the External Power Supply Unit VP232-2

⚠ DANGER

Electric injury due to live parts

When an external power supply unit is still switched on, coming in contact with live parts can lead to electric shock or burn.

- Switch off the external power supply unit.
- Pull the power plug of the external power supply unit for safe disconnection from the power supply.



1 Fuse (2x)
2 Fuse holder
3 Fuse box

Parts and Tools

- 2x Fuse type T 4.0A H 250V

Procedure

1. If the fuses fail, first check the cause and remedy technical problems properly.
2. Remove the fuse holder 2 by pulling it to the front. Use a small screwdriver for this purpose if necessary.
3. Remove the fuses 1 from the fuse holder and replace with new fuses.
4. Push the fuse holder back into the fuse box 3 until it engages.

14.3.2 Cleaning an Optical Surface

NOTICE

Damage of optical surfaces due to improper cleaning

- Remove dust from the optical surface slowly and carefully.
- Remove dust on optical surfaces with a natural-hair brush or blow it off with a dust blower.
- Avoid touching optical surfaces with fingers.
- Never use abrasive compounds or cleaners.

Parts and Tools

- Clean cloth
- Cotton swab
- Distilled water
- Optical cleaning solution (70 % ethanol)
- Lint-free cloth

Procedure

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

3. Dry with a lint-free cloth.

14.3.3 Removing Water-Soluble Contamination

Parts and Tools

- Clean cloth
- Lint-free cloth

Prerequisite

✓ The microscope and its components are switched off and disconnected from the power supply.

Procedure

1. Remove dust and loose dirt particles with a soft brush or clean lint-free cloth.
2. If necessary, moisten a clean cloth with water. **Info** **A mild detergent (no solvent!) may be added to the water for stubborn dirt.**
3. Wipe off the area with the moistened cloth. **Info** **Labels on the device may only be cleaned using a dry cloth.**
4. Dry with a lint-free cloth.

15 Troubleshooting

The following table provides information about solving common problems. The troubleshooting for the hardware components is provided in the corresponding chapters.

Info

If you cannot solve the problem or if you are unsure about a certain technical difficulty, contact your local ZEISS service representative.

15.1 Common microscopy troubles

The troubleshooting table below contains the most frequently common microscopy problems.

Symptom	Measure
Shadows or inhomogeneous image brightness in the field of view; the field is not entirely visible	▪ Set the aperture stop correctly (centering, aperture). ▪ Set the field stop correctly (centering, opening). ▪ Insert the filter correctly in the filter mount.
Low resolving power and poor image contrast	▪ Set the aperture stop using the 2/3 rule or to match the sample features. ▪ Turn the sample slide over; the sample side should be on top. ▪ Remove the bubbles by applying new oil. ▪ Adjust the cover glass correction ring to the correct cover glass thickness.
Asymmetric image sharpness, e.g. one side is sharp, one side is blurred.	▪ Insert the sample in the specimen holder correctly and clamp it.
Dirt or dust in the field of view	▪ Set the aperture stop using the 2/3 rule or to match the sample features. ▪ *Clean the optical surfaces of the affected components [▸ 91]*.
The halogen lamp does not function although the on / off switch is set to "on".	▪ Connect the power plug to an appropriate power outlet. ▪ Connect the power plug to an appropriate power outlet. ▪ *Exchange halogen lamp 12 V, 100 W [▸ 59]*. ▪ *Exchange halogen lamp 12 V, 100 W [▸ 59]*. ▪ *Exchange the fuses [▸ 90]*. ▪ Contact your local ZEISS service representative.
Halogen lamp flickers, illumination intensity is not stable	▪ *Exchange halogen lamp 12 V, 100 W [▸ 59]*. ▪ Connect the power plug to an appropriate power outlet. ▪ Insert the pins of the halogen lamp correctly.

15.2 DIC/ PlasDIC contrast problems

The troubleshooting table below contains the most frequently DIC/ PlasDIC contrast problems.

A portion of the field of view is missing

Affected component	Measure
Condenser	▪ Set the condenser correctly (adjust, center).
DIC slider	▪ The DIC slider is not fully inserted into the nosepiece. *Push DIC slider until it stops [▸ 125]*.
Nosepiece / Objective	▪ Ensure that the nosepiece with the objective is clicked into place.

There is no contrast in the DIC image

Affected component	Measure
Combination of optical elements	▪ Wrong or no polarizing elements in the beam path, check hardware compatibility.
Condenser	▪ Set the condenser correctly (adjust, center).
Nosepiece / Objective	▪ The objective is not compatible with DIC.
Polarizer / Analyzer	▪ Wrong or no polarizing elements in the beam path, check hardware compatibility.
Specimen / Stage	▪ Check if the sample carrier is DIC compatible (e.g. no plastic lids).

The contrast in DIC image is poor

Affected component	Measure
Combination of optical elements	▪ Wrong or no polarizing elements in the beam path, check hardware compatibility. ▪ Confirm that the combination of the objective, DIC slider and condensor module is correct.
Condenser	▪ Set the condenser correctly (adjust, center).
Polarizer / Analyzer	▪ Set the aperture stop using the 2/3 rule or to match the sample features.

15.3 Fluorescence image problems

The troubleshooting table below contains the most frequently fluorescence image problems.

The image is not a fluorescent image

Affected component	Measure
Reflector turret	▪ Check reflector turret for correctly installed filters. ▪ Check for correctly selected reflector turret position (filter). ▪ Select an appropriate filter set.
Light source	▪ Check if the right light source is selected.

Affected component	Measure
Environment	▪ Check if there is ambient light entering the image.

The contrast in the fluorescent image is poor

Affected component	Measure
Light source	▪ *Set the illumination intensity [▸ 65]* of the used light source to an appropriate level.
Sideport switcher	▪ Correctly set the optical path and eliminate the influence from ambient light by the splitoptical path.
Reflector turret	▪ Check reflector turret for correctly installed filters. ▪ Check for correctly selected reflector turret position (filter). ▪ Select an appropriate filter set.
Nosepiece / Objective	▪ Immersion objectives used without (the correct) immersion liquid. Use Immersol 518 F® immersion oil from ZEISS.
Specimen/ Stage	▪ Use a low-fluorescent glass slide and cover glass.
Environment	▪ Check if there is ambient light entering the image. ▪ Decrease ambient light or shield the light from above by attaching the light protection cloth.

The image is invisible/ dark

Affected component	Measure
Light source	▪ *Set the illumination intensity [▸ 65]* of the used light source to an appropriate level.
Sideport switcher	▪ Correctly set the optical path and eliminate the influence from ambient light by the splitoptical path.
Reflector turret	▪ Select an appropriate filter set. ▪ Check reflector turret for correctly installed filters.

Visually observed fluorescence color does not match the color of the image on the monitor

Affected component	Measure
Camera white balance	▪ Use the white balancing in the software.
Settings of channel color	▪ Select the right color for the channel which is used in the software.
Monitor	▪ Set the white balancing on the monitor.

15.4 Focus problems

The troubleshooting table below contains the most frequently focus problems.

Out of focus

Affected component	Measure
Nosepiece / Objective	▪ Perform a parfocality calibration. ▪ *Screw the objective in as far as it will go. [▸ 38]* ▪ Wrong cover glass thickness. Use standardized 0.17 mm cover glasses.
Specimen / Stage	▪ Insert the sample in the specimen holder correctly and clamp it. ▪ *Attach the stage correctly [▸ 46]*. ▪ Check the orientation of the sample: The cover glass points towards the objective. ▪ Wrong cover glass thickness. Use standardized 0.17 mm cover glasses. ▪ Insert the sample in the specimen holder correctly and clamp it.

One side of the field of view (up, down, right, or left) is not in focus

Affected component	Measure
Specimen / Stage	▪ Insert the sample in the specimen holder correctly and clamp it. ▪ *Attach the stage correctly [▸ 46]*.
Nosepiece / Objective	▪ Ensure that the nosepiece with the objective is clicked into place.

The image flows (i.e. becomes asymmetrically defocused when moving the focal point)

Affected component	Measure
Specimen / Stage	▪ Insert the sample in the specimen holder correctly and clamp it. ▪ *Attach the stage correctly [▸ 46]*.
Nosepiece / Objective	▪ Ensure that the nosepiece with the objective is clicked into place.

Difficult to focus

Affected component	Measure
Specimen / Stage	▪ Insert the sample in the specimen holder correctly and clamp it.
Z-drive control	▪ *Perform the focusing operation with the coarse Z-drive control [▸ 77]*.
Nosepiece / Objective	▪ Check if the registered objective information is correct for the used objective.

15.5 Image problems

The troubleshooting table below contains the most frequently image problems.

The image is invisible/ dark

Affected component	Measure
Apotome	▪ Check if the Apotome slider is completely removed or inserted.
Field stop	▪ Check dia-illumination field stop.
General	▪ *Check if the microscope and its components are switched on [▸ 75]*.
Light source	▪ Check if the power plug is plugged correctly. ▪ Connect the power plug to an appropriate power outlet.
Nosepiece / Objective	▪ Ensure that the nosepiece with the objective is clicked into place.
Shutters	▪ Check the dia-illumination shutter.
Sideport switcher	▪ Check if the sideport switcher is in the right position.
Sliders	▪ *Check if there are sliders not completely inserted into the beam path [▸ 137]*. ▪ Check if there is a Bertrand Slider in the beam path.
Specimen / Stage	▪ Check if the sample carrier is in transparent position.

The image is too bright

Affected component	Measure
Contrast Manager	▪ Check if all filters or hardware is set up correctly.
Light source	▪ *Set the illumination intensity [▸ 65]* of the used light source to an appropriate level.

The image is yellowish, greenish or bluish

Affected component	Measure
Filter changer	▪ Check the filter changer for inserted color filters.
Phosphorescence filter	▪ Check for inserted phosphorescence filter.
Reflector turret	▪ Check reflector turret for correctly installed filters. ▪ Check for correctly selected reflector turret position (filter).

Light intensity fluctuates

Affected component	Measure
Light source	▪ End of average service life of 12 V 100 W halogen lamp. Replace the lamp. ▪ Check if the power plug is plugged correctly. ▪ Connect the power plug to an appropriate power outlet.

Affected component	Measure
	▪ The pins of the 12 V 100 W halogen lamp haven not been inserted correctly in the receptacle. ▪ LED Lamp has a failure.

Visually observed image color does not match the color of the image on the monitor

Affected component	Measure
Camera white balance	▪ Use the white balancing in the ZEN. ▪ Set the white balancing on the monitor.
Settings of channel color	▪ Select the right color for the channel which is used in the software.

The field of view is limited or cut off

Affected component	Measure
Condenser	▪ Set the condenser correctly (adjust, center). ▪ Set the aperture stop correctly (centering, aperture). ▪ Insert the filter correctly in the filter mount.
Field diaphragm	▪ Set the field stop correctly (centering, opening).
Nosepiece / Objective	▪ Ensure that the nosepiece with the objective is clicked into place. ▪ Remove the bubbles by applying new oil.
Reflector turret	▪ Check for correctly selected reflector turret position (filter).
Sliders	▪ The DIC slider is not fully inserted into the nosepiece. *Push DIC slider until it stops [▸ 125]*.

Reduced image quality

Affected component	Measure
Condenser	▪ *Clean the optical surfaces of the affected components [▸ 91]*. ▪ Set the condenser correctly (adjust, center).
Environment	▪ Check if there is ambient light entering the image.
Nosepiece / Objective	▪ Wrong cover glass thickness. Use standardized 0.17 mm cover glasses. ▪ Set the correction ring to the correct thickness. ▪ Turn slide so that the sample is facing up. ▪ Clean the front lens of the objective.
Reflector turret	▪ Check for correctly selected reflector turret position (filter).
Specimen/ Stage	▪ *Adjust the eyepieces for visual impairments [▸ 35]*. ▪ Clean the sample. ▪ *Clean the optical surfaces of the affected components [▸ 91]*.

Affected component	Measure
	▪ Immersion objectives used without (the correct) immersion liquid. Use Immersol 518 F® immersion oil from ZEISS. ▪ Turn slide so that the sample is facing up.

Dirt or dust is highly visible in the image

Affected component	Measure
Camera	▪ Clean the camera.
Condenser	▪ *Clean the optical surfaces of the affected components [▸ 91].*
Eyepieces	▪ *Clean the optical surfaces of the affected components [▸ 91].*
Nosepiece/ Objective	▪ *Clean the optical surfaces of the affected components [▸ 91].*
Specimen/ Stage	▪ *Clean the optical surfaces of the affected components [▸ 91].*

The image drifts

Affected component	Measure
Incubation	▪ Temperature equilibration was not sufficient before start.
Specimen / Stage	▪ Insert the sample in the specimen holder correctly and clamp it.

The focal deviation is high when objectives are switched over

Affected component	Measure
Binocular	▪ *Set the interpupillary distance correctly. [▸ 35]* ▪ *Adjust the eyepieces for visual impairments [▸ 35].*
Nosepiece / Objective	▪ Perform a parfocality calibration. ▪ *Screw the objective in as far as it will go. [▸ 38]*

Binocular images are not integrated as a single image. Eyes are tired during observation

Affected component	Measure
Binocular	▪ *Set the interpupillary distance correctly. [▸ 35]* ▪ *Adjust the eyepieces for visual impairments [▸ 35].*

15.6 Phase contrast problems

The troubleshooting table below contains the most frequently phase contrast problems.

There is no contrast in the phase contrast image

Affected component	Measure
Nosepiece / Objective	▪ Check if phase contrast objective is used.
Condenser	▪ Set the condenser correctly (adjust, center). ▪ Set the aperture stop using the 2/3 rule or to match the sample features.
Combination of optical elements	▪ Confirm that the combination of the PH objective and the annular diaphragm is correct.

The contrast in the phase contrast image is poor

Affected component	Measure
Nosepiece / Objective	▪ Check if phase contrast objective is used.
Condenser	▪ Place the PH module (annular diaphragm) for PH microscopy into the optical beam path. ▪ Center the annular phase diaphragm. ▪ Set the aperture stop using the 2/3 rule or to match the sample features.

The quality of the Ph image is poor

Affected component	Measure
Specimen / Stage	▪ Some samples are not ideal for phase contrast imaging. Try other contrasts, e.g. DIC.

16 Transport and Storage

The following regulations must be observed before and during transport:

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

Maximum shock resistance

- Do not drop or bump the boxes during movement or storage. Acceleration must not exceed 10 g.
- Evaluate packaging shock and tilting sensors on delivery and after internal transport.

Allowable temperature

Allowable temperature during transport in packaging:

- Between -40 °C and +70 °C
- Relative humidity (without condensation) less than 75 % at 35 °C

Allowable temperature during storage:

- Between +10 °C and +40 °C
- Relative humidity (without condensation) less than 75 % at 35 °C

Info

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

16.1 Weight and Sizes of the Transported Goods

Below is an example of the transport boxes that may be delivered (depends on the system configuration):

Box	Approx. Length (mm)	Approx. Width (mm)	Approx. Height (mm)	Approx. Weight (kg)
Pallet box 1	1200	800	1000	90
Pallet box 2	800	600	1000	50
Box for accessories	1080	900	820 - 1000	10 - 30

16.2 Transporting and Storing the Microscope

⚠ CAUTION

Muscle strains and back injuries due to heavy weight

The microscope is heavy. Wrong handling, e.g. lifting alone, might lead to injuries or damage the microscope.

- Organize an assistance for transportation.
- Only transport the microscope over short distances, i.e. within the same building.
- Use the supplied grip holders for lifting or transporting the microscope.
- Do not attempt to grab the microscope anywhere else for lifting or transporting the microscope.
- Transport of the microscope over long distances may only be performed by the ZEISS service representative.

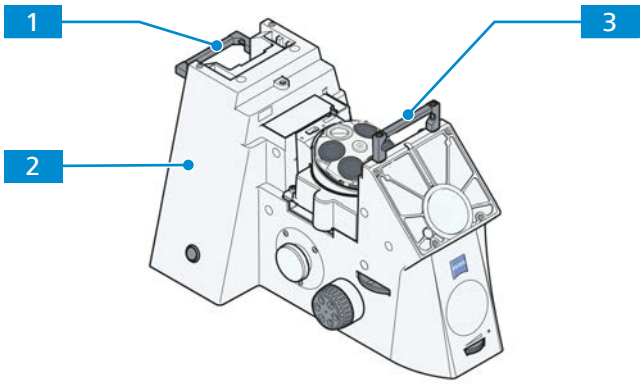


Fig. 42: Unpacking the microscope

1	Grip holder, rear	2	Stand
3	Grip holder, front		

Parts and Tools
- Hex key, 4.0 mm

Prerequisite
- ✓ The microscope is disconnected from the mains.

Procedure

1. Deinstall additional accessories or components.
   NOTICE **Do not use the carrier for transmitted light illumination of the microscope for lifting.**
2. Remove all cables from the microscope, where possible.
3. Deinstall and package all assemblies, and accessories e.g. light sources, stage, condenser, objectives, tube.
4. Remove the plastic cover from the holes on the stand 2.
5. Install the front grip holder 3.
6. Screw in the two fixing screws of the front grip holder.
7. Grap the back grip holder 1 with the left hand.
8. Grap the front grip holder 3 with the right hand.
9. While holding the holders, carefully place the microscope into the packaging.

17 Decommissioning and Disposal

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

17.1 Decommissioning

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

> **⚠ DANGER**
>
> **Electric injury due to live parts**
>
> When the microscope and its components are still switched on, coming in contact with live parts can lead to electric shock or burn.
>
> - Switch off the microscope and its components prior to opening or cleaning.
> - Disconnect the microscope and its components from the mains.

Procedure

1. Switch off the microscope.
2. Pull the power supply plug.
3. Protect microscope using a dust cover.

17.2 Disposal

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

ZEISS introduced a procedure for the return and recycling of the instruments within the member states of the European Union which ensures suitable recycling procedures conforming to the EU directives.

For more information on disposal and recycling consult your ZEISS Sales & Service Partner. The microscope may not be disposed of in the household waste or through municipal waste disposal services. If the microscope is resold, the seller shall be obliged to inform the buyer that the microscope must be disposed of in accordance with the regulations.

The customer is responsible for decontamination.

17.3 Decontamination

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

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

18 Technical Data and Conformity

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

18.1 Performance Data and Specifications

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. 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.

Location requirements

The microscope may only be operated in closed rooms. The microscope should not be installed near radiators or windows with direct sunlight. The microscope must be placed securely on the table surface to prevent slipping and falling.

Compliance with the installation requirements of the microscope is the responsibility of the customer. The requested supplies have to be readily available at the time of installation.

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

Air Conditioning and Quality

Optical Resolution Performance	
Ambient temperature	22 °C
Range for best optical performance	± 3 °C
Reduced optical performance operation (out of range for best optical performance)	10 to 19 °C and 25 to 35 °C
Image and Data Stability	
Recommended best temperature stability	± 1.0 °C
General	
Relative humidity	< 65 %
Microscope max. Heat Dissipation*	Min 150 W Max 1150 W Average ~500 W
Warm-up time	For long term experiments the usage of Definite Focus 3 is recommended. Without Definite Focus 3 it is suggested to warm up the microscope for ~2h.
Pollution degree	2

*depends significantly on the configuration and settings of the microscope.

Weight and Sizes

The table below gives some indication on the approximate weight and sizes of the unpacked items.

Main Components	Width x Length x Height	Weight
Axio Observer	295 mm x 805 mm x max. 707 mm	27 - 36 kg

Mains Connection

Nominal AC voltage	100 to 240 VAC ±10 % 200 - 1000 VA
Nominal frequency	50 - 60 Hz ± 5 %
Main Power Plug	Local mains plug will be supplied.
Power consumption	max. 300 VA
Max. current	Axio Observer 3, Axio Observer 5: 100 – 127 VAC / 200 - 240 VAC / max. 300 VA; 3/1,5 A Axio Observer 7: 100 - 240 VAC; 2,3/1,0 A
Accessories mains power	Standard local 230 V or 120 V mains socket
Overvoltage Category	II

18.2 Applicable Standards and Regulations

The Axio Observer 3, Axio Observer 5, Axio Observer 7 is a product for research purposes only. It conforms to current international standards (e.g. IEC 61010-1) as well as to harmonized standards of the applied EU directives.

The Axio Observer 3, Axio Observer 5, Axio Observer 7 complies with the following EU directives:

2011/65/EU and delegated directive (EU) 2015/863	Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), amended by Commission Delegated Directive (EU) 2015/863 of 31 March 2015
2012/19/EU	WEEE Directive
2014/30/EU	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility
2014/35/EU	Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
(EC) No 1907/2006	Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Not for therapeutic use, treatment, or medical diagnostic evidence. Not all products are available in every country. Observe all general and country-specific safety regulations as well as applicable environmental protection laws and regulations.

ZEISS conforms to the following management system standards: ISO 9001, ISO 13485, ISO 14001, and ISO 50001.

18.3 Declaration of China RoHS

Information table of names and content of hazardous substances in the product:

	Hazardous Substances									
Part Name	**Pb**	**Hg**	**Cd**	**Cr6+**	**PBBs**	**PBDEs**	**DBP**	**DIBP**	**BBP**	**DEHP**
Cables	x	o	o	o	o	o	o	o	o	o
Electronical Parts	x	o	x	o	o	o	o	o	o	o
Optical Parts	x	o	x	o	o	o	o	o	o	o
Mechanical Parts	x	o	o	o	o	o	o	o	o	o
Lamps	x	x	o	o	o	o	o	o	o	o

Note 1:
O: Indicates that the content of this hazardous substance in all homogeneous materials of this component does not exceed the requirements of the national standard for restriction of hazardous substances in electrical and electronic products.
X: Indicates that the content of this hazardous substance in at least one homogeneous material of this component exceeds the requirements of the national standard for restriction of hazardous substances in electrical and electronic products.

Note 2:
Components not listed above indicate that their hazardous substance content does not exceed the requirements of the national standard for restriction of hazardous substances in electrical and electronic products.

19 Accessories and Optional System Expansions

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

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

Info

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

Name	Description/Info
Cameras	The following cameras and accessories are available: ▪ Axiocam family ▪ SLR camera ▪ Digital camera and video
Condensers	The following condensers are available: ▪ LD Condenser 0.35 manual ▪ LD Condenser 0.55 manual ▪ LD Condenser 0.55 motorized
Filter wheels	▪ Filter wheel excitation 8-pos. mot. for filters d=25mm ▪ Dual filter wheel mot. for beam splitting and emission
Light sources	The following light sources are available: ▪ HAL 100 ▪ HBO 100 ▪ HBO 50 ▪ HXP 120 V ▪ microLED ▪ Viluma 5/7 ▪ Viluma 9 ▪ VIS-LED 2 ▪ X-Cite XYLIS II®
Sliders	The following sliders are available: ▪ Slider FL attenuator, manual ▪ Slider FL attenuator, motorized ▪ Stop slider for aperture and luminous-field diaphragm
Stages	These stages are used to position the sample in x and y either manually or software controlled. Travel range and movement precision vary between the types offered. ▪ Mechanical stage 130x85 R/L ▪ Specimen Stage 250x230 ▪ Heatable Microscope Stage S1 ▪ Gliding Stage Z

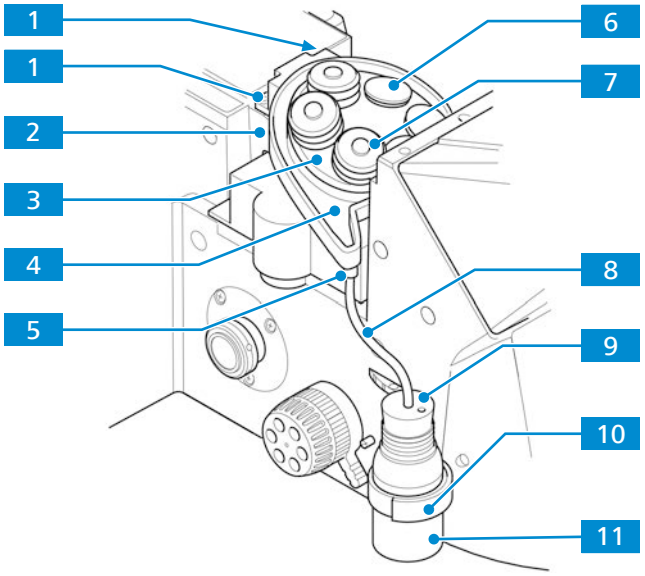
Name	Description/Info
	▪ Scanning Stage 130x100 Piezo ▪ Scanning Stage 130x100 Step ▪ Scanning Stage 130x85 MAT ▪ Scanning Stage 130x85 mot P
AI Sample Finder	AI Sample Finder makes it possible to automatically record standard biomedical sample holder and convert them into sample holder templates. In addition, AI Sample Finder supports the user in locating and digitizing his samples in XYZ and using them for fast and highly efficient navigation. Only available with Axio Observer 7.
Aqua Stop	The *aqua stop [▸ 109]* protects the objectives and the nosepiece when working with liquid samples.
Auto immersion module	The Auto immersion module is a device for forming a film of immersion fluid between the sample carrier and the microscope objective. Only available with Axio Observer 7.
Definite Focus 3	Compensates a focus drift and keeps the sample in focus even in time lapse experiments. Only available with Axio Observer 7.
SVB 1	The SVB 1 is used for the synchronized control of external components during the fast image recording process with ZEN software.
Various Filter sets	Filters are available for various dyes and dye combinations. More detailed information on available and recommended filters can be found at www.micro-shop.zeiss.com or ask your ZEISS Sales & Service Partner.
Various objectives	The objective affects the performance of your microscope like no other system component. Best image quality can only be achieved with the objective that best suits your experiment, whether you work with histological samples, cell samples or entire organisms. More detailed information on available and recommended objectives can be found at www.micro-shop.zeiss.com or ask your ZEISS Sales & Service Partner.

19.1 Aqua Stop II

Purpose The Aqua Stop II protects the objectives and the nosepiece when working with liquid samples.

Position The Aqua Stop II is mounted on the nosepiece carrier.

19.1.1 Assembling the Aqua Stop II



1	Fixing screw (2x)	2	Nosepiece mount
3	Cover disk	4	Collecting trough
5	Drainage connector	6	Cover cap
7	Lens hood	8	Drainage tube
9	Collecting bottle's bung	10	Velcro® fastener
11	Collecting bottle		

Parts and Tools Hex key, 3.0 mm

Prerequisite ✓ The stage is removed from the stand.

Procedure

1. Place the collecting trough 4 on the nosepiece mount 2.
2. Screw in the collecting trough's two fixing screws 1.
3. Place the cover disk 3 at the nosepiece, matching the corresponding holes to those for the objectives.
4. Install the required objectives.
5. ***NOTICE*** **Make sure that each objective is enclosed up to the cover disk and that no hood's upper edge forms a drip tray!**
   Pull a **small** lens hood 7 over each objective of a front diameter of **16 to 22.5 mm**.
6. Pull a **large** lens hood over each objective of a front diameter of **27.5 to 34 mm**.
7. Insert a cover cap 6 into each unused nosepiece opening.
8. Attach one end of the drainage tube 8 to the collecting trough's drainage connector 5.
9. Put the drainage tube's other end through the collecting bottle's bung 9, such that the tube protrudes about 4 mm above the bung.

10. **NOTICE** **Adjust the drainage tube such that it will not be bent through focusing.** Firmly insert the bung into the collecting bottle.
11. Attach the Velcro® fastener 10 to the stand.
12. Fix the collecting bottle 11 with the Velcro® fastener to the stand.
13. Attach the stage.

NOTICE

Performance impairment by liquids

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

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

19.2 Autocorr Objective

19.2.1 Assembling the Autocorr Objectives

Prerequisite

✓ When retrofitting autocorr objectives in most cases the firmware of the microscope has to be updated.

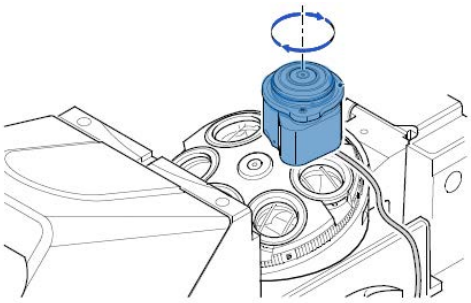
✓ The micoscope is switched off.

✓ To avoid the risk of collision of the objective with the stand, the orientation of the motor group must be checked and – if necessary – realigned.

✓ The stage is disassembled.

Procedure

1. Empty all nosepiece positions.
2. Screw on the autocorr objective.



→ If only one autocorr objective is used, screw the objective into position 3 or 4 of the nosepiece.

→ If the cables for the autocorr objectives are fastened using the installation kit, position 6 of the nosepiece must remain free.

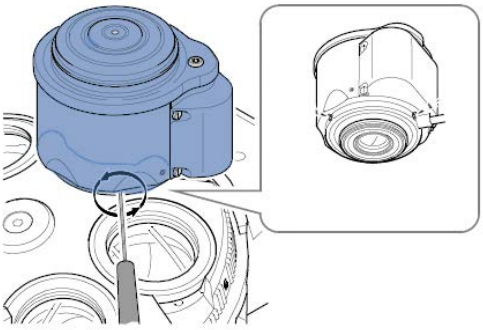
↳ When using autocorr objectives, the nosepiece switches automatically to "Slider" mode. Thus, the nosepiece will move to positions 1 to 6 in sequence (1-2-3-4-5-6-5-4-3-2-1) and there is no rotation over 300°. Further autocorr objectives must, however, be installed in rotation at every second position.

19.2.2 Aligning the Motor Group

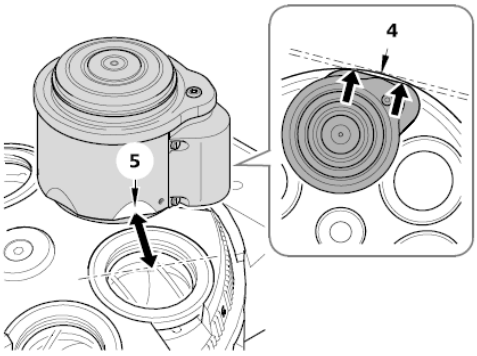
Parts and Tools Hex key, 1.0 mm

Procedure

1. Release the three screws on the base of the objective (half a turn is sufficient).



2. Rotate the nosepiece by hand to obtain access to the individual screws.
3. Turn clockwise to reach the motor position, to prevent the objective from becoming loose again.



4. Align the flat side of the motor group to an imaginary tangent 4 along the rotary table. The indents 5 in the sleeve should point towards the respective neighboring position.
5. Subsequently, re-tighten the three screws on the base of the objective. Do not use excessive force so as to prevent damage to the thread.
6. After installing the autocorr objective, mount all the other objective positions.

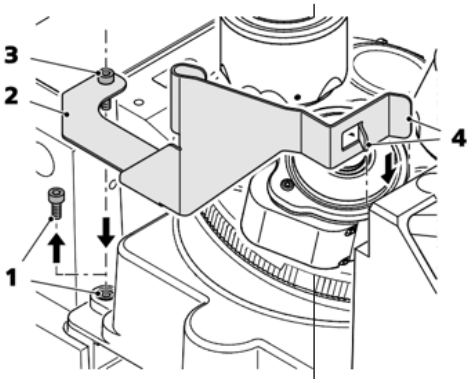
19.2.3 Cabling with the Installation Kit

> ***NOTICE***
>
> At maximum number of three autocorr objectives, these will be installed in the nosepiece positions **1**, **3** and **5**. The collective port is at position **6**, positions **2** and **4** are available for other objectives or may remain empty.

Parts and Tools Hex key, 2.5 mm

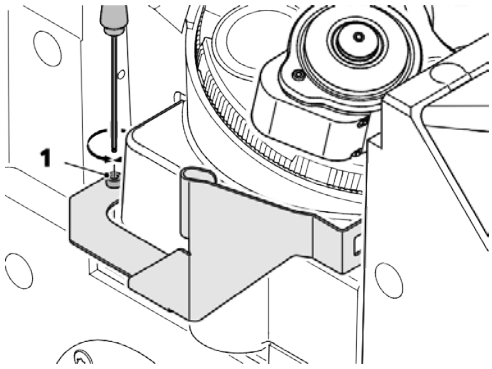
Procedure

1. Screw out the locking screw of the reflector module cover 1.

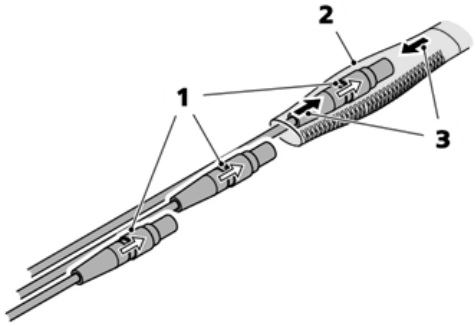


2. Insert the hex key in proximity of the Z-drive into the screw.

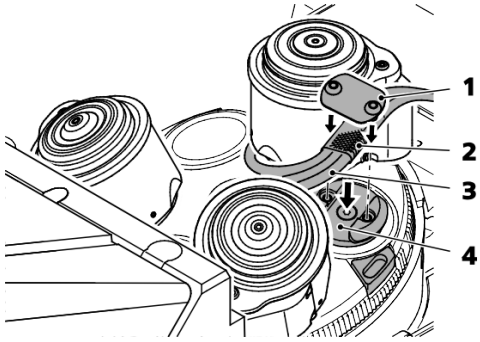
3. Insert the guide plate 2 from the top left of the nosepiece. The two tabs 4 of the guide plate serve as a guide for fastening the guide plate to the rib of the stand.
4. Screw on the guide plate.



5. *Assemble the Collective Port [▸ 113]*.
6. Compress fabric tube axially 3, so that it expands and its feeding length is minimized. The ends of the fabric tube 2 are reinforced.

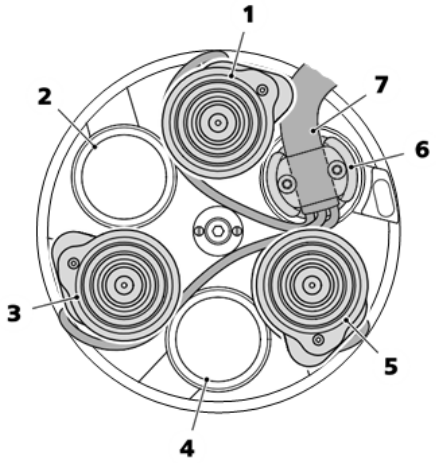


7. Insert the cables 1 one after the other into the fabric tube.
8. Then pull the fabric tube by alternately pushing or pulling on the cable.
9. At the other end of the fabric tube, pull each cable out of the fabric tube.
10. Ensure that the cables in the fabric tube are not twisted and did not change their position to each other.
11. Guide the cables of autocorr objectives as closely as possible between the objective positions through the center of the nosepiece to the collective port.
12. Insert the cables together with the end of the fabric tube.



13. Place the clamping plate 1.

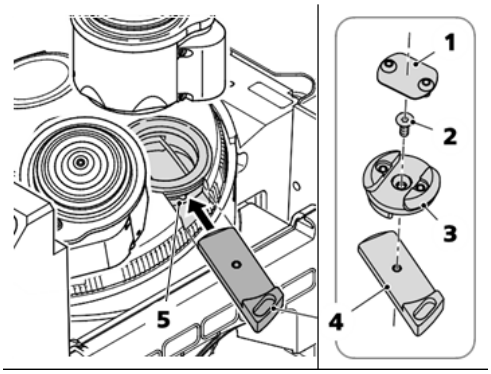
14. Tighten both screws of the clamping plate to fasten the cable harness 7.



19.2.4 Assembling the Collective Port

Procedure

1. Insert the slide piece 4 up to the stop in the DIC slot 5 of position 6 on the nosepiece.



2. Insert the cable guide 3 from above into the nosepiece position so that it is flush with the slider piece 4.
3. Secure with screw 2.

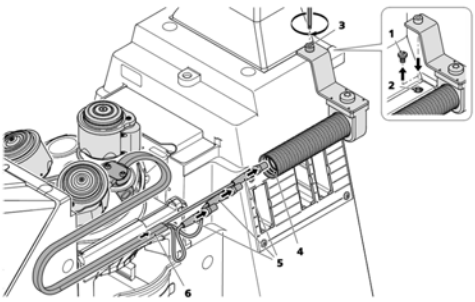
19.2.5 Mounting the Transfer Tunnel and route the cable harness

Parts and Tools

- Hex key, 2.5 mm

Procedure

1. Screw out the blind screw 1 of the hole in the stand 2.



2. Attach the transfer tunnel 4 to the stand.
3. Screw it on using the captive screw 3.
4. Guide the cable harness 6 through the transfer tunnel 4. When using multiple cables 5 pull them through one after the other.
5. If necessary, remount any disassembled components (e.g. stage) to the microscope.

> **Info**
>
> If necessary, fasten the end of the fabric tube to the cables with tape to prevent that the fabric band is caught in the transfer tunnel.

19.2.6 Mounting the Transfer Tunnel for Incubator XL and Route the Cable Harness

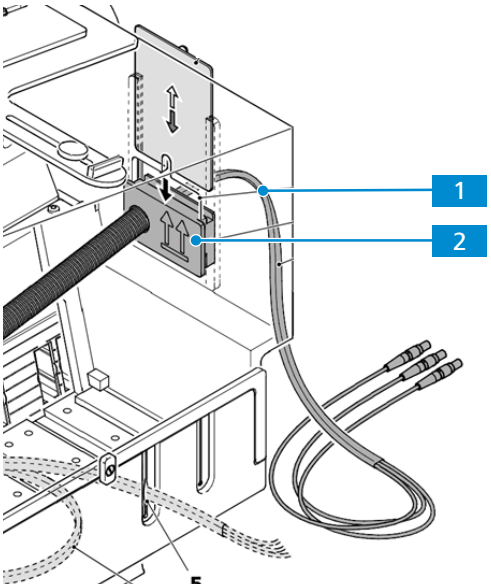
> **NOTICE**
>
> If the transfer tunnel cannot be installed, the cable harness should be routed on a lateral cable guide to the outside. Ensure that the cable harness is laid in a sufficiently large loop on the bottom (lower part) of the incubator XL, so that rotary movement of the nosepiece is not obstructed. When placing the incubator XL down, do not squeeze the cable harness.

Prerequisite

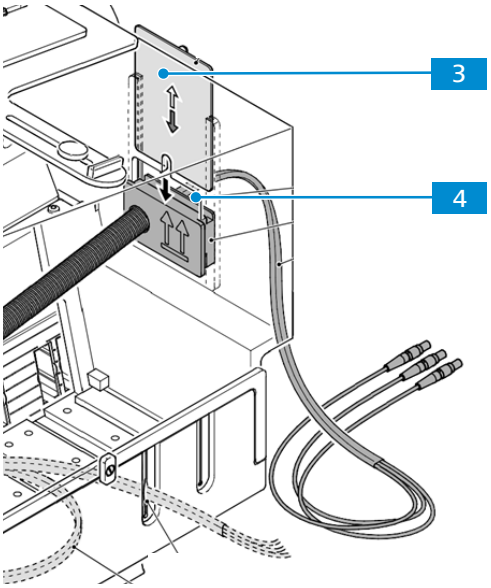
✓ The TFT display from the microscope is dissembled.

Procedure

1. Route the cable harness 1 through the transfer tunnel 2.

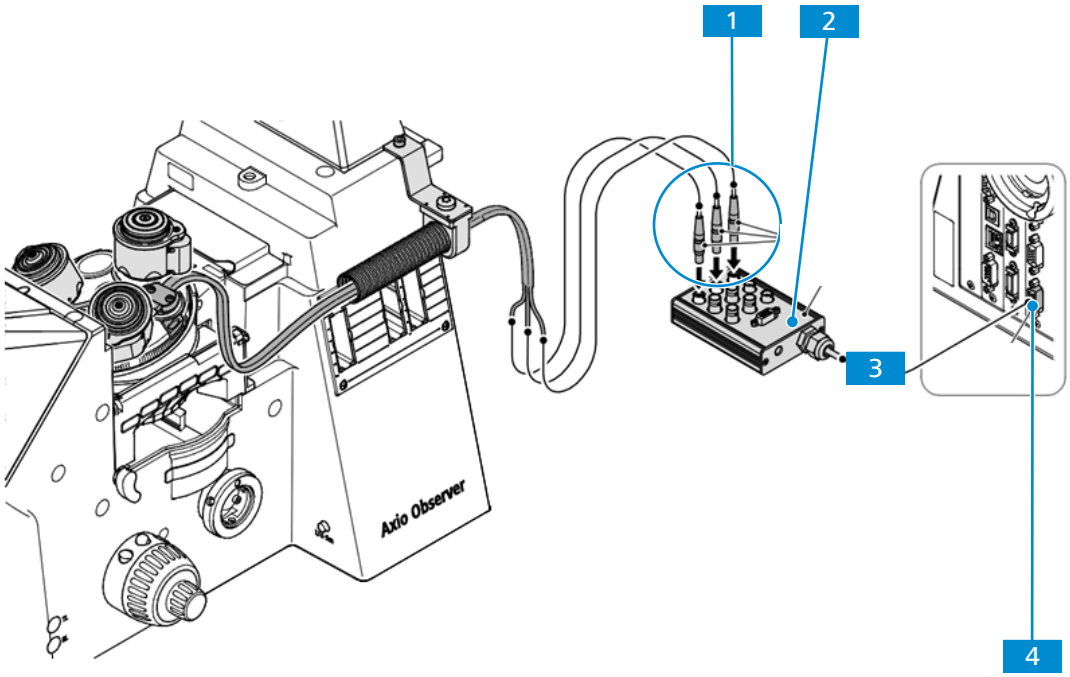


2. Set the incubator onto the stand.
3. To handle the incubator, open the upper right front door.
4. Lift the right rear trapdoor 3 of the incubator upwards.



5. Insert the transfer tunnel into the opening 4 of the trapdoor and push it downwards.
6. Push down the trapdoor to fasten the transfer tunnel.
7. Insert the lower parts of the incubator.

19.2.7 Establishing the electrical connection

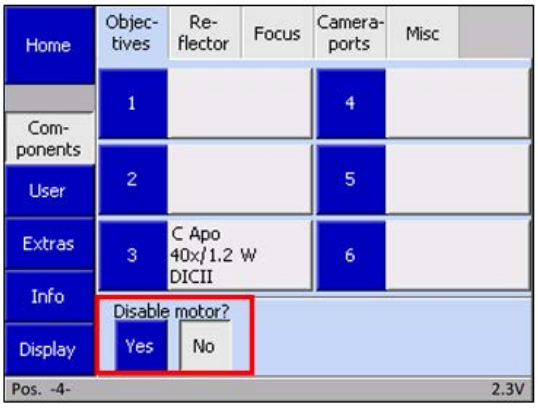


Procedure

1. Connect cables of the autocorr objectives 1 to the correspondingly marked sockets of the CAN distributor 2 using plug-in connectors.
2. Plug cable of the CAN connector 3 into any CAN socket of the stand 4.
3. Connect the microscope to the power supply and switch it on.
   → Initialization of the autocorr objective motor can be heard.

NOTICE

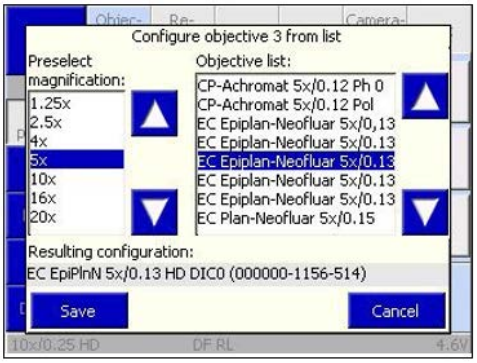
The cables may impede operation with motorized rotation of the nosepiece. In this case, activate the "Disable motor" option by pushing **Yes** and turn the nosepiece manually to prevent the cables from being squeezed and, if applicable, the nosepiece from being blocked.



19.2.8 Configuring the Autocorr Objectives via TFT

Procedure

1. In case of entries, make sure to enter the correct and complete item number to avoid errors in assignment of the CAN address.



2. After completing configuration, restart the microscope.

19.3 Automatic Component Recognition (ACR)

Automatic Component Recognition (ACR) is a function that recognizes automatically objectives, identifies reflector modules and recognizes the exchange of components.

19.3.1 Automatic Component Recognition Axio Observer 5, 5 materials

When replacing a reflector module, the system will register the replaced component. This is important for operator comfort and safety: It helps avoid operating errors and the need for time-consuming programming.

Automatic component recognition for the reflector turret is initiated automatically as soon as the ACR reflector turret cover is closed.

> **Info**
>
> ACR with reflector modules requires a reflector turret mot. ACR. The reflector modules must also be marked with "ACR".

19.3.2 Automatic Component Recognition Axio Observer 7, 7 materials

When replacing an objective or a reflector module, the system will register the replaced component. This is important for operator comfort and safety: It helps avoid operating errors and the need for time-consuming programming.

The differences between automatic component recognition for the nosepiece and for the reflector turret are explained below.

- Reflector turret:
  Automatic component recognition for the reflector turret is initiated automatically as soon as the ACR reflector turret cover is closed
- Nosepiece:
  Automatic component recognition for the nosepiece is initiated by pressing the appropriate button on the **Settings > Components > Objectives** *screen [▸ 117]* on the TFT display.

The Axio Observer 7 materials stand is always equipped with the ACR nosepiece (part of delivery scope).

For the Axio Observer 7 stand the nosepiece is an optional component. This includes:

- Standard mot. (without ACR)
- Standard mot. with ACR
- Definite Focus.3 (mot. with ACR)
- Definite Focus 3

Info

For ACR functionality with objectives, these must be additionally equipped with an appropriate "ACR objective ring".

ACR with reflector modules requires a reflector turret mot. ACR. The reflector modules must also be marked with "ACR".

19.3.2.1 Configuring the Nosepiece with ACR Function

Procedure

1. Press **Home > Settings > Components > Objectives** on the TFT display.

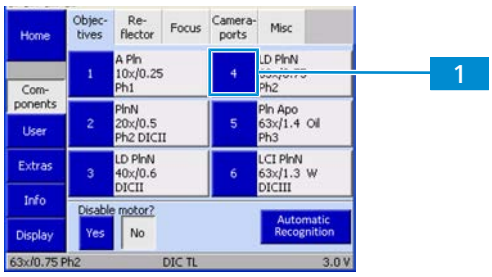
→ The **Objectives** tab appears on the screen.

2. Press **Automatic Recognition** 2 to configure the nosepiece positions automatically.
3. Press **Yes** or **No** 1 to disable or enable the motor if an objective heater or a piezo focus is fitted under the objective.

19.3.2.2 Configuring the Nosepiece without ACR Function

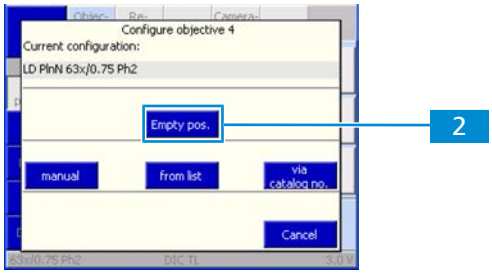
Procedure

1. Press **Home > Settings > Components > Objectives** on the TFT display.



→ The **Objectives** tab appears on the screen.

2. Press the relevant button to configure the nosepiece position, e.g. the **4** button 1.



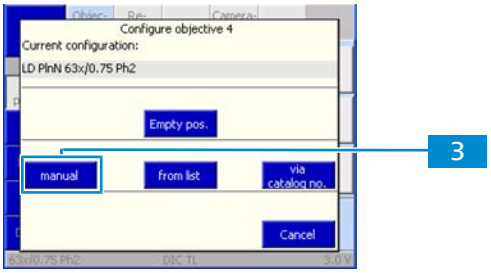
→ The **Configure objective 4** pop-up window appears.

3. Press **Empty pos.** 2 to set the position to empty or to clear the current objective selection.
4. If required, select the relevant nosepiece position and confirm by pressing **Yes**.

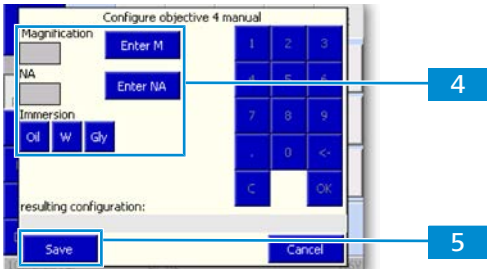
Manual Configuration

Procedure

1. Press the **manual** button 3.



2. Enter magnification and numerical aperture (NA) and select the immersion information of the installed objective manually 4.

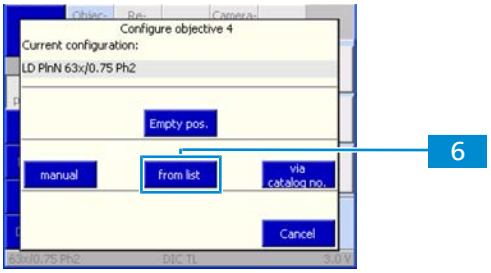


3. Confirm with **Save** 5.
4. Press **Cancel** to close the pop-up window without saving the objective selection.

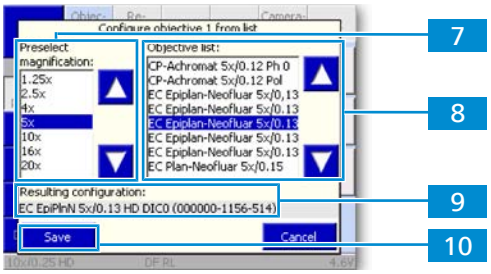
Configuration via Selection from List

Procedure

1. In the **Configure objective #** pop-up window, press the **from list** button 6.



2. Preselect the magnification of the objective 7.

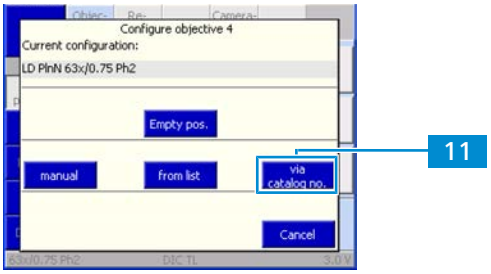


3. Select the objective type from the list 8.
   → The selection is shown in **Result configuration:** field 9.
4. Confirm with **Save** 10.
5. Press **Cancel** to close the pop-up window without saving the objective selection.

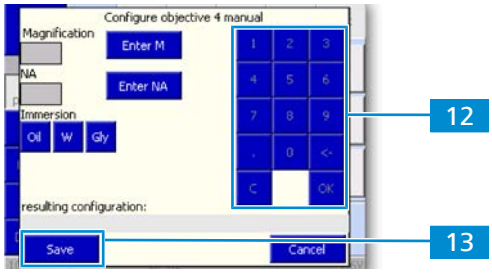
Configuration via Catalog No.

Procedure

1. In the **Configure objective #** pop-up window, press the **via catalog no.** button 11.



2. Enter the 13-digit ZEISS catalog number 12.



   → The prefixed six zeros or the affixed seven zeros should not be entered (after 123456 enter a hyphen (-) or enter 1234-567 and press **OK**). The missing zeros will be added automatically.

3. Confirm with **Save** 13.
4. Press **Cancel** to close the pop-up window without saving the objective selection.
5. Repeat the procedure for all nosepiece positions.
6. Set **Yes** or **No** 14 to disable or enable the motor if an objective heater or a piezo focus is fitted under the objective.

19.4 Cameras

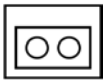
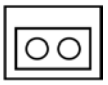
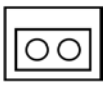
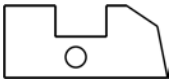
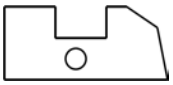
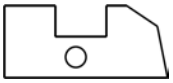
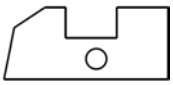
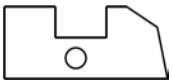
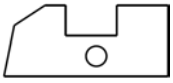
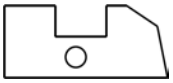
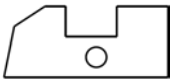
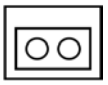
19.4.1 Image Orientation of Camera Outputs for Documentation

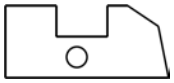
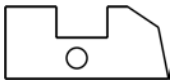
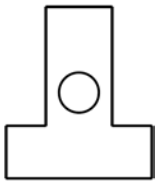
The microscope is fitted with up to five documentation ports, depending of the configuration:

- frontport for connecting an SLR, video or digital camera (e.g. ZEISS Axiocam) via a special video or camera adapter
- sideport (right or left) for connecting record-keeping equipment via a 60N mm port
- baseport (bottom) for connecting record-keeping equipment via a 60N mm port
- binocular photo tube with 60N port

The descriptions are based on an sample, such as a stage micrometer, with readable figures or letters to illustrate the orientation:

Original sample:		Viewed without microscope
The sample is placed on the microscope stage with the readable side, as shown above, towards the objective and then appears, as viewed from above by the microscope user, as follows:		
		**This view is the reference view for the following description.**
Also viewed from above, a movement of the specimen stage in the Y direction backwards (thick arrow) and in the X direction to the right (thin arrow) looks like this:		
		

Order number/ Description	Viewed with/switch position	Intermediate image of the sample/monitor	Sample movement	Viewing direction schematic
425537-0000-000 Binocular tube	Eyepieces (100% vis)			
425536-0000-000 Binocular photo tube	100% vis : 0% doc			
	50% vis : 50% doc 0% vis : 100% doc			
425535-0000-000 Binocular ergotube	Eyepieces (100% vis)			
425150-0000-000 Sideport 60N, left, 2 switch positions	20% vis : 80% doc			
425151-0000-000 Sideport 60N, left, 2 switch positions	0% vis : 100% L			
425152-0000-000 Sideport 60N, left, 3 switch positions	50% vis : 50% L 0% vis : 100% L			
425153-0000-000 Sideport 60N, right, 3 switch positions	50% vis : 50% R 0% vis : 100% R			
425154-0000-000 Sideport 60N left and right 3 switching positions	0% vis : 100% L			
	20% vis : 80% R			
425155-0000-000 Sideport 60N left and right 3 switching positions	0% vis : 100% L			
	0% vis : 100% R			
425165-0000-000 Sideport 60N L80/R100, 3 switch positions	0% doc left/ right			

Order number/ Description	Viewed with/switch position	Intermediate image of the sample/monitor	Sample movement	Viewing direction schematic
	20 vis : 80% doc left			
	0 vis : 100% doc right			
000000-1069-228 Beam path switching	100% frontport			
000000-1069-229 Beam path switching mot.	100% frontport			
425126-0000-000 baseport	100% doc			

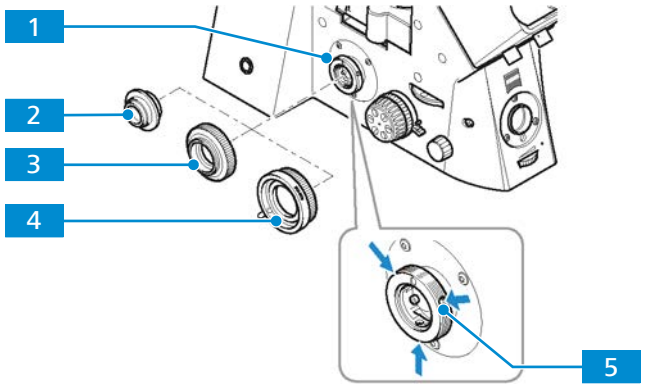
Use of camera adapters which work without using intermediate imaging does not affect image orientation. The same applies to the frontport with connectors V200 T2 2.5x for SLR (000000-1279-493) and video adapter V200 C 2/3" 0.63x (000000-1071-171).

The use of Optovars (e.g. 1.25x or 1.6x) also does not change the image orientation.

19.4.2 Installing the Camera Adapter

Info

When working with microphotographic devices, consult the corresponding manuals of the cameras as well.



1	Sideport, left	2	Camera adapter 60
3	Camera adapter 60N	4	Camera adapter 60N
5	Set screw (3x)		

Parts and Tools

- Hex key, 3.0 mm

Adapter for Interface 60N

Prerequisite

✓ Stand type Axio Observer 5 or Axio Observer 7 available.

Procedure

1. Fix the camera adapter 60N 3 or 4 to the camera.
2. Remove the dust cap from the sideport 1.
3. Attach the pre-assembled unit to the sideport.
4. Adjust it and fasten the union nut of the adapter fingertight.
   → The three set screws 5 at the camera port must not extend either to the external thread or into the internal bore hole.

Adapter for Interface 60 (plug-in diameter 30 mm)

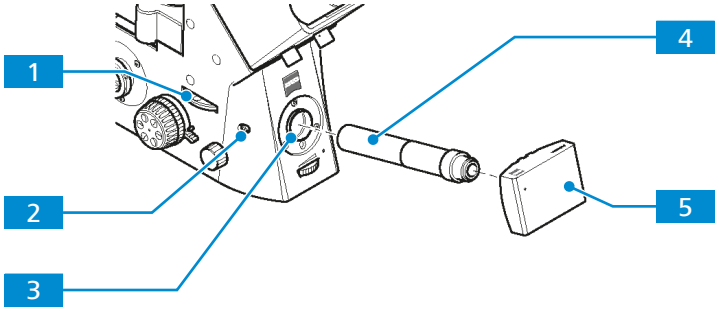
Prerequisite

✓ Stand type Axio Observer 5 or Axio Observer 7 available.

Procedure

1. Attach the camera adapter 60 2 to the camera.
2. Remove the dust cap from the camera port.
3. Insert the pre-assembled unit in the camera port (do not screw in set screws too deeply).
4. Turn the three set screws 5 clockwise until the adapter is tight.

19.4.3 Installing the Digital Camera or Video Camera



1	Beam path selector wheel	2	Clamping screw
3	Frontport	4	V200 C 2/3" 0.63x video adapter
5	Video camera or digital camera		

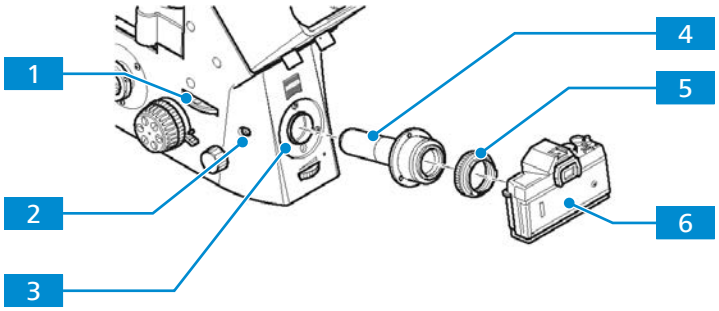
Parts and Tools Hex key, 3.0 mm

Prerequisite ✓ Stand type Axio Observer 5 or Axio Observer 7 available.

Procedure

1. Remove dust cover or camera lens from the camera 5.
2. Remove the dust cover from the V200 C 2/3" 0.63x video adapter 4.
3. Screw the V200 C 2/3" 0.63x video adapter into the thread of the camera.
4. Remove dust cover from the frontport 3.
5. Attach the pre-mounted camera system to the frontport.
6. Align it horizontally.
7. Tighten clamping screw 2.
8. Switch the beam path from visual observation to the frontport. Use the beam path selector wheel 1.
   → 100% of the light is now available for the camera.
9. Observe the manufacturer's manual to operate the camera.

19.4.4 Installing the SLR Camera



1	Beam path selector wheel	2	Clamping screw
3	Frontport	4	V200 T2 2.5x adapter for SLR
5	T2 adapter	6	SLR camera

Parts and Tools Hex key, 3.0 mm

Prerequisite ✓ Stand type Axio Observer 5 or Axio Observer 7 available.

Procedure

1. Remove dust cover or camera lens from the camera 6.
2. Attach appropriate T2 adapter 5 to the camera.
3. Remove the dust cover from the V200 T2 2.5x adapter for SLR 4.
4. Screw the V200 T2 2.5x for SLR adapter into the thread of the T2 adapter.
5. Remove dust cover from the frontport 3.
6. Attach the pre-mounted camera system to the frontport.
7. Align it horizontally.
8. Tighten clamping screw 2.
9. Switch the beam path from visual observation to the frontport. Use the beam path selector wheel 1.
   → 100% of the light is now available for the camera.
10. Observe the manufacturer's manual to operate the camera.

19.5 Contrast Manager on Axio Observer 7

Contrast Manager is used for rapid switching between contrast techniques and for configuring mixed contrasts. This facilitates the finding of contrasted cells and the allocation of fluorescence signals to a particular position in the cell.

When a new objective is moved into the optical path, all necessary settings for the contrast technique used will be applied. This includes both shutter settings and the position of the condenser turret.

If, for example, the user is working with phase contrast, the condenser turret position with the phase stop for the current objective will automatically be moved into the optical path. The shutter positions will be retained.

Using the Contrast Manager's buttons (FL, BF, PH, DIC), it is possible to combine contrast techniques as required, e.g.: brightfield, phase contrast, or DIC with fluorescence.

19.6 Differential Interference Contrast (DIC)

An imaging light microscopy method that converts differences in the optical path length in the object into differences in the brightness of the image.

19.6.1 Changing the Condenser's DIC Prisms

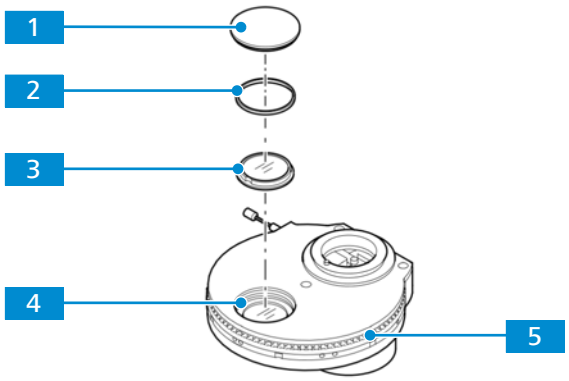


Fig. 43: Changing the condenser's DIC prisms

1	Cover cap	2	Retaining ring
3	DIC prism	4	Mounting hole
5	Condenser		

Parts and Tools
- Tool set for prism exchange
- Tweezers

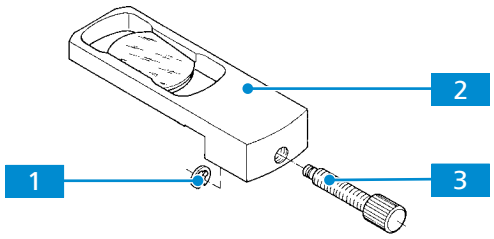
Prerequisite
- ✓ The condenser is removed from the microscope and placed on a stable surface.

Procedure
1. Remove the cover cap 1 from the condenser's prism mounting hole 4.
2. If required, turn the knurled ring 5 to bring the desired turret position into the mounting hole.
3. Screw out the retaining ring 2 from the mounting hole. Use the corresponding mounting plate of the tool set.
4. **NOTICE Avoid the contact of sensitive optical components to hard surfaces.** Turn the condenser upside down to let the present DIC prism 3 slide out onto a soft surface.
5. Carefully grab the prism to be installed at its circumference. Use tweezers.
6. Carefully insert the prism with the label pointing upwards into the mounting hole. Match its notch with the corresponding lug in the condenser turret.
7. Screw in the retaining ring.
8. Attach the mounting hole's cover cap.

19.6.2 Refitting the DIC slider for DIC applications

Parts and Tools
- Hex key, 1.5 mm

Procedure
1. Pull off the snap ring 1 from the adjustment screw 3 of the DIC slider 2.



2. Screw out the adjustment screw 3.
3. Refit the DIC slider.

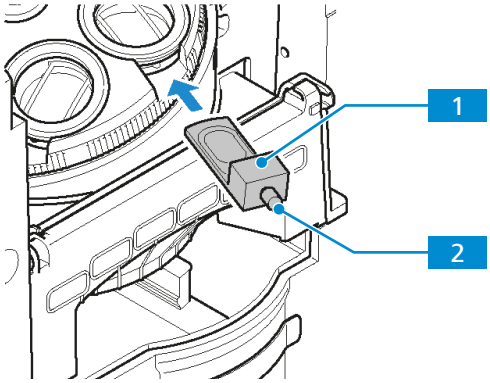
19.6.3 Setting Up for Reflected Light DIC Microscopy

Parts and Tools
- Objective for DIC with compatible DIC slider
- Objective for Pol

Prerequisite
- ✓ A DIC/Pol P&C or DIC/Pol P&C Red I reflector module for reflected light is installed.
- ✓ The light source for transmitted light illumination is installed and adjusted.
- ✓ The microscope is operational for reflected light microscopy.

Procedure
1. Adjust the microscope for *reflected light brightfield [▸ 81]*.
2. Open the luminous-field diaphragm until the edge just disappear from the field of view to avoid reflections.
3. Swivel the reflector module DIC/Pol P&C on the reflector turret into the beam path.
4. To produce color contrasts, use reflector module DIC/Pol Red I P&C.
5. Swivel in the objective position with DIC slider slot.

6. Insert the DIC slider 1 into the slot on the nosepiece.



7. Place the sample on the stage.
8. *Focus [▸ 77]* until the sample structure of interest appears at maximum contrast.
9. Optimize the contrast by turning the setting screw 2 on the DIC slider.

19.6.4 Setting Up for Reflected Light C-DIC Microscopy

Parts and Tools

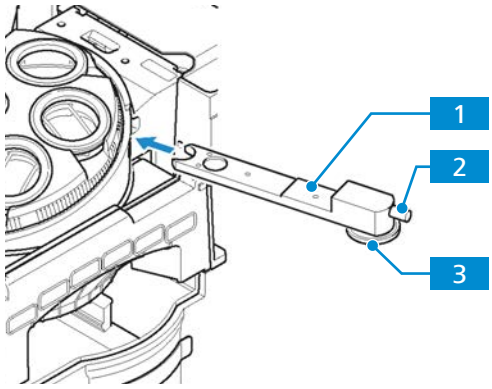
- Objective for DIC with compatible DIC slider
- Objective for C-DIC with C-DIC slider 6x20
- Objective for Pol

Prerequisite

- ✓ A C-DIC/TIC P&C reflector module (in combination with C-DIC slider 6x20) for reflected light is installed.
- ✓ The light source for transmitted light illumination is installed and adjusted, if required.
- ✓ The microscope is operational for reflected light microscopy.

Procedure

1. Adjust the microscope for *reflected light brightfield [▸ 81]*.
2. Swivel the reflector module C-DIC/TIC P&C on the reflector turret into the beam path.
3. Insert the C-DIC slider 6x20 1 into the slot.



4. Place the sample on the stage.
5. *Focus [▸ 77]* until the sample structure of interest appears at maximum contrast.
6. Optimize the contrast by turning the setting screw 2 on the C-DIC slider.
7. Turn the setting wheel 3 on the C-DIC slider to align the structures vertically to the "light-shadow" direction and thus achieve maximum contrast.

19.6.5 Setting Up for Transmitted Light DIC Microscopy

19.6.5.1 Transmitted Light DIC with Fixed Analyzer Slider

Info

Because the DIC technique uses polarized light, it will be disrupted if birefringent objects, e.g. foils occasionally used with histological sections, are positioned between the polarizer and analyzer. This problem may also arise with Plexiglas culture chambers if the chamber bottom is made of plastic. In such cases, it is advisable to use chambers with glass bottoms to avoid impairment of the optical performance.

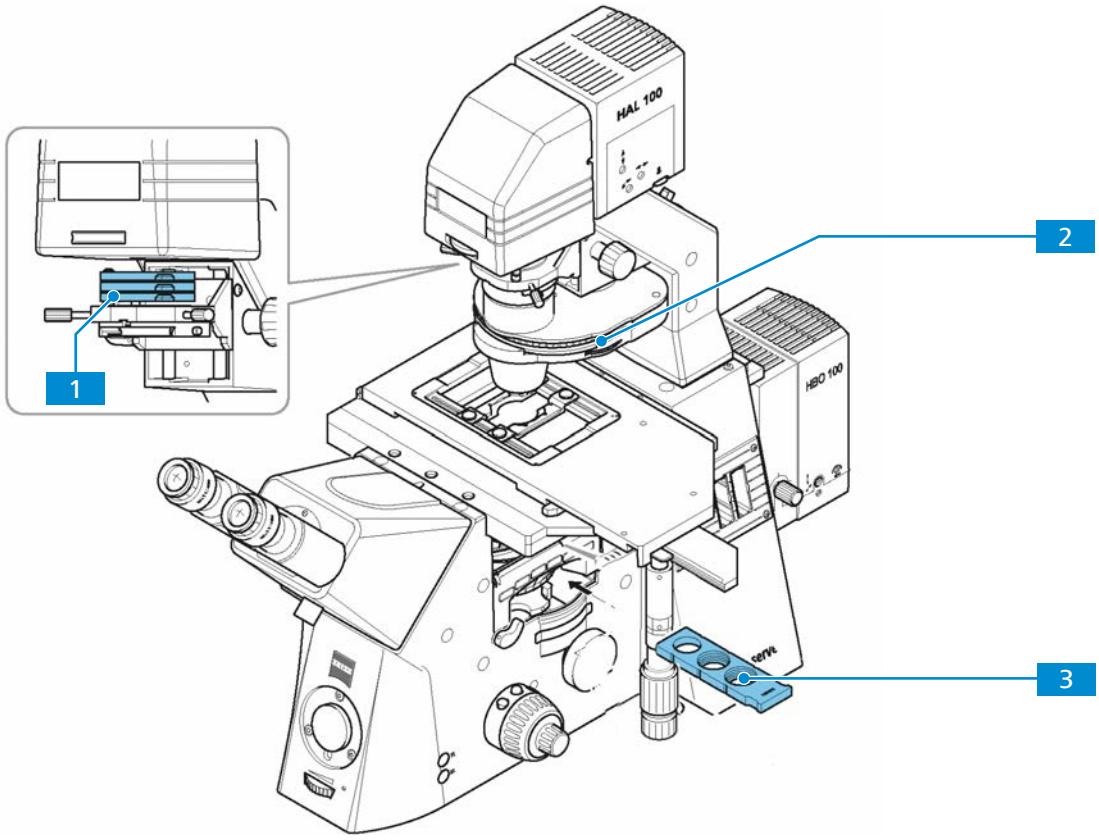


Fig. 44: Setting up for transmitted light DIC microscopy

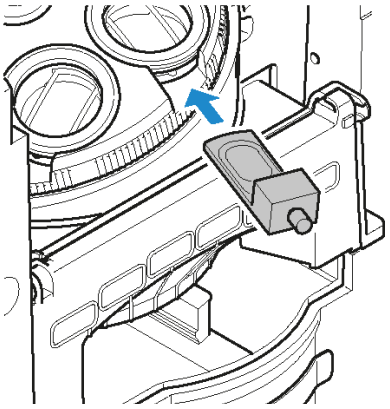
1 Polarizer D fixed (optional: rotatable)
2 Knurled ring of the condenser
3 Analyzer slider, fixed

Prerequisite

- ✓ The microscope is operational.
- ✓ Objective equipped with DIC fixtures, e.g. EC Plan-NEOFLUAR DIC, is installed.
- ✓ DIC slider, compatible with the objectives in use, is available.
- ✓ Condenser with turret disk equipped with DIC prisms (DIC I, DIC II, DIC III) or DIC condenser module is installed.
- ✓ Polarizer, e.g. polarizer D with 2-position filter changer is available (only required where the condenser used does not have a DIC prism with integrated polarizer).
- ✓ The fixed analyzer slider is available.

Procedure

1. Swivel the DIC compatible objective into the beam path.
2. Slide the according DIC slider into the slit of the appropriate objective position.



3. Swivel the polarizer 1 into the beam path.
4. Use the knurled ring 2 to select the appropriate DIC prism I, II or III on the condenser turret.
5. Place the sample onto the stage.
6. Adjust field diaphragm and aperture stop according to the KÖHLER method.
7. Insert the analyzer slider 3 into the slot of the stand.
8. Adjust the optimal contrast with the adjustment screw on the DIC slider.
   Symmetrical adjustment of the DIC slider along its middle position lets the sample details appear as if they were elevated or deepened.

19.6.5.2 Transmitted Light DIC with ±30° Analyzer Slider (de SÉNARMONT)

Info

Because the DIC technique uses polarized light, it will be disrupted if birefringent objects, e.g. foils occasionally used with histological sections, are positioned between the polarizer and analyzer. This problem may also arise with Plexiglas culture chambers if the chamber bottom is made of plastic. In such cases, it is advisable to use chambers with glass bottoms to avoid impairment of the optical performance.

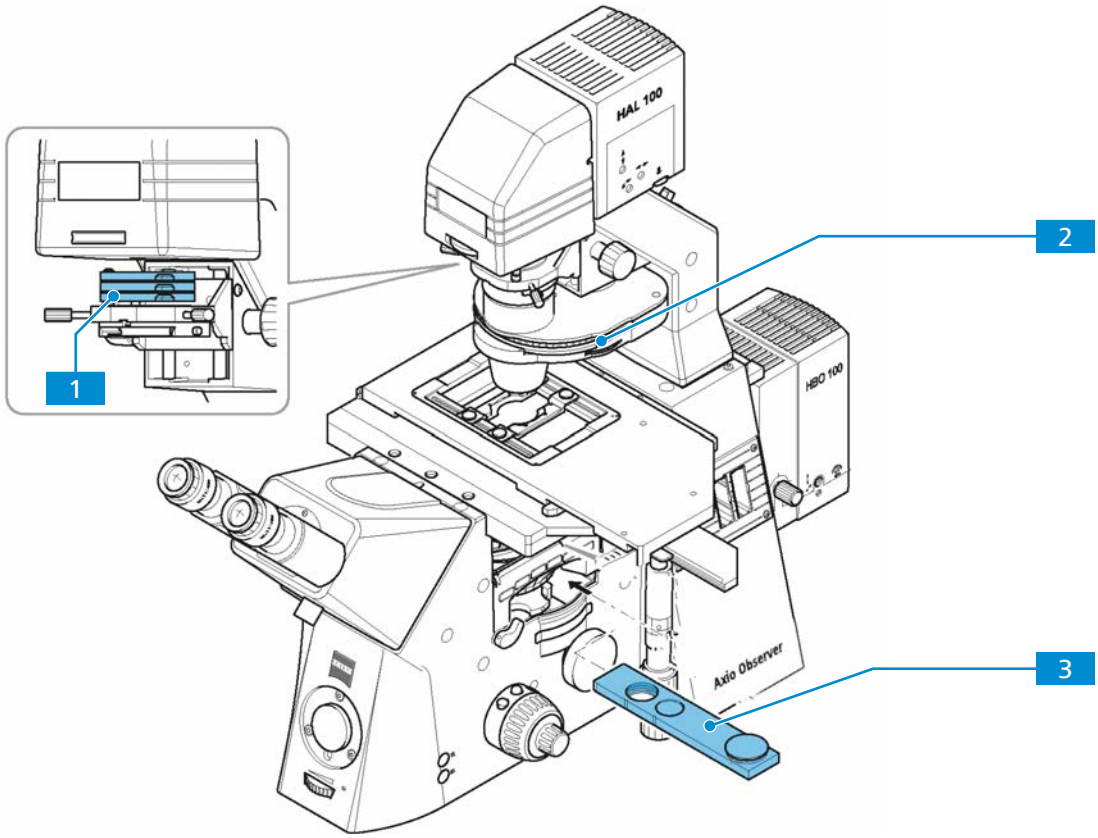


Fig. 45: Setting up for transmitted light DIC microscopy

1 Polarizer D fixed (optional: rotatable)
2 Knurled ring of the condenser
3 ±30° analyzer slider

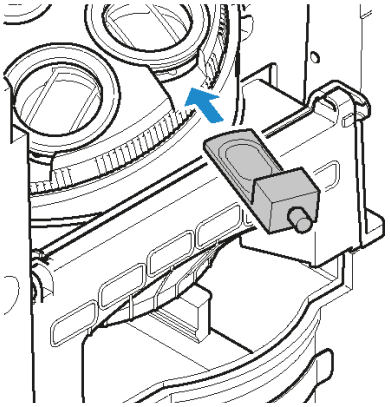
Prerequisite

- ✓ The microscope is operational.
- ✓ Objective equipped with DIC fixtures, e.g. EC Plan-NEOFLUAR DIC, is installed.
- ✓ DIC slider, compatible with the objectives in use, is available.
- ✓ Condenser with turret disk equipped with DIC prisms (DIC I, DIC II, DIC III) or DIC condenser module is installed.
- ✓ Polarizer, e.g. polarizer D with 2-position filter changer is available (only required where the condenser used does not have a DIC prism with integrated polarizer).
- ✓ The ±30° analyzer slider (de SÉNARMONT) 3 is available.

Procedure

1. Swivel the DIC compatible objective into the beam path.

2. Slide the according DIC slider into the slit of the appropriate objective position.



3. Swivel the polarizer 1 into the beam path.
4. Insert the ±30° analyzer slider 3 into the slot of the stand.
5. If necessary: Use the knurled ring 2 to deselect the DIC prism on the condenser turret (e.g. use bright field or phase contrast).
6. Remove one eyepiece and replace with the centering telescope (or swivel the Bertrand lens into position on the photo tube).
   → If the field is viewed using the centering telescope (or Bertrand lens), a diagonal black line on the DIC slider (left top to bottom right) will be visible.
7. Move the diagonal black line to the center of the field of view. Use the knurled screw of the DIC slider .
8. Remove the centering telescope and reinsert the eyepiece (or move the Bertrand lens out of the optical path).
9. Use the knurled ring 2 to select the appropriate DIC prism I, II or III on the condenser turret.
10. Place the sample onto the stage.
11. Rotate the analyzer away from the 0° position until optimum contrast is obtained.

19.6.6 Setting Up for Transmitted Light PlasDIC Microscopy

Prerequisite

✓ The microscope is operational.

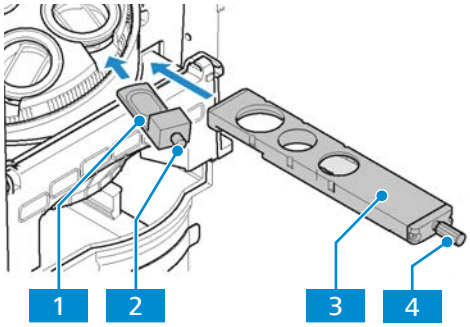
✓ One of the following condensers with mounted Slit aperture 3.5 mm PlasDIC is installed:
LD condenser 0.35 H, Ph0, Ph1, Ph2, DIC, DIC; 6-position;
LD condenser 0.55 H, Ph1, Ph2, Ph3, DIC, DIC; 6-position;
LD condenser 0.55 H, Ph1, Ph2, Ph3, DIC, DIC; 6-position;
or
LD condenser 0.35 H, Ph PlasDIC DIC iHMC with mounted Slit aperture 3.5 mm PlasDIC for condenser (10x-40x) or Slit aperture 5 mm PlasDIC for condenser (40x/63x)

✓ One of the following objectives is *installed [▸ 38]*:
LD A-Plan 10x to 63x;
LD Plan-Neofluar 20x/0.4 Corr M27x;
LD Plan-Neofluar 40x/0.6 Corr M27;
LD Plan-Neofluar 63x/0.75 Corr M27

✓ One of the following PlasDIC components is available:
Contrast slider 3-position 10x29 mm for PlasDIC module and analyzer (with PlasDIC module LD A-Plan 10x-63x or PlasDIC module LD PN 20x, 40x)
or
PlasDIC slider for LD A-Plan 10x-63x (a separate analyzer or analyzer module will be required)
or
Individual PlasDIC sliders for objectives LD Plan-Neofluar Corr (20x, 40x, 63x) (a separate analyzer or analyzer module will be required)

Procedure

1. Place the sample on the stage.
2. Set the sample for transmitted light brightfield.
3. Swivel the PlasDIC compatible objective into the beam path.
4. Slide the according DIC slider into the slit of the appropriate objective position 1.
5. Slide the analyzer into the slot below the nosepiece.
   Or
   Slide the 3-position contrast slider 3 with fitted PlasDIC module into the slot below the nosepiece (a analyzer is not necessary).



6. On the condenser, fully open the aperture.
7. Swing the condenser position with the 3 or 5 mm slit diaphragm for PlasDIC into the beam path.
8. Increase the brightness.
9. Swing in the analyzer module on the reflector turret (or slide the analyzer slider into the intermediate plate for analyzer sliders).
10. With the knurled screw 2 on the DIC slider or the knurled screw on the 3-position contrast slider 4, adjust the optimal contrast.
    The structures are visible in relief or in pseudo-darkfield. The relief display provides the best contrast.

19.6.7 PlasDIC

Differential Interference Contrast for Plastic Receptacles.

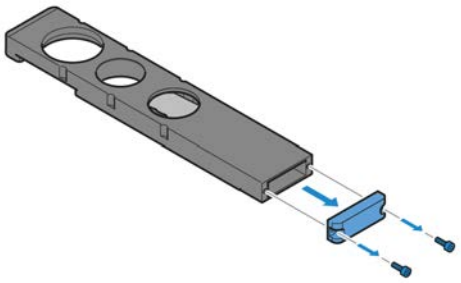
19.6.7.1 Assembling the PlasDIC Module to the 3 Position Contrast Slider

Parts and Tools

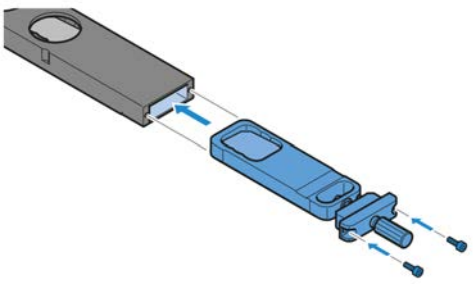
- Hex key, 1.5 mm

Procedure

1. Loosen two screws.
2. Remove the cover plate.



3. Insert the PlasDIC module LD A-Plan 10x-63x into the 3 position contrast slider.



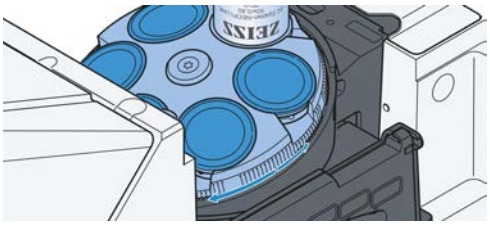
4. Fix the PlasDIC module with two screws.

19.6.7.2 Setting PlasDIC with PlasDIC Module on the Contrast Slider

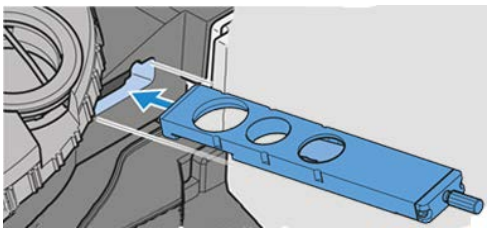
Prerequisite ✓ The microscope is operational.

Procedure

1. Swivel the PlasDIC compatible objective into the beam path.



2. Fully open the aperture stop of the condenser.
3. Place the sample on the stage.
4. Rotate the condenser position with the slit diaphragm for PlasDIC into the beam path.
5. If required, increase the illumination brightness.
6. Slide the three-position contrast slider into the slot below the nosepiece (an analyzer is not necessary).

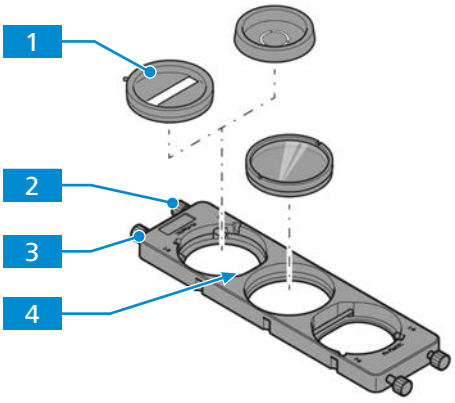


7. Choose the position with the PlasDIC module.
8. With the knurled screw on the PlasDIC module, adjust the optimal contrast.
   → Structures may be shown in relief or in pseudo darkfield images. Relief imaging delivers the best contrast.

19.6.7.3 Assembling a Diaphragm in the Slider 10x46 mm Ph/PlasDIC, H, Ph/PlasDIC

Procedure

1. Loosen the centering screws 2, 3.



2. Insert the diaphragm 1 at an angle, pressing against the leaf spring 4.
3. Screw in the centering screws 2, 3 until the diaphragm 1 is fixed and is approximately centered in the mount.

19.7 Improved Hoffman Modulation Contrast (iHMC)

Oblique illumination technique that enhances contrast in living cells and tissues by detecting optical phase gradients.

19.7.1 Assembling the iHMC Contrast Module to the Condenser

Parts and Tools

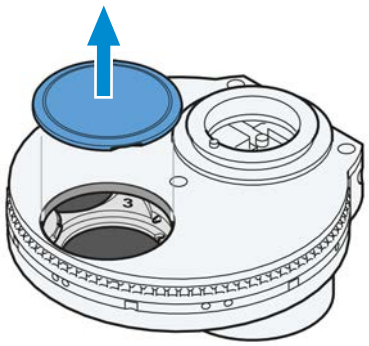
- Mounting tool
- Hex key, 1.5 mm

Prerequisite

✓ The condenser is rotated so that the mounting hole is accessible.

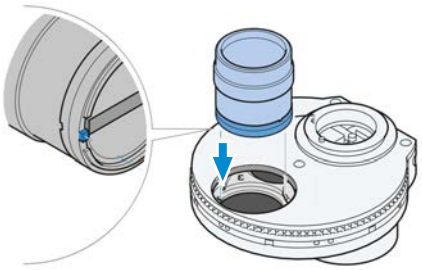
Procedure

1. Remove the sealing cap from the mounting hole.



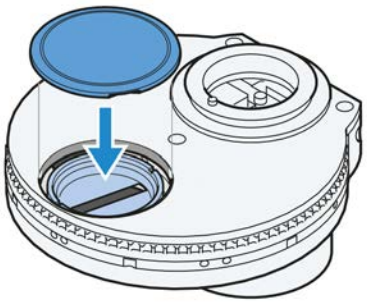
2. Screw the desired contrast module onto the thread of the mounting tool.

3. Loosen the two centering screws on the mounting hole. Use the hex key.
4. Slightly tilt the mounting tool with the contrast module.
5. Insert the contrast module into the mounting hole. Press the bevel of the contrast module socket against the aluminum-colored pressure piece.
6. Rotate the alignment unit of the mounting tool to engage the cam into the recess.



7. Hold the alignment unit and turn the mounting tool to remove it from the contrast module.

8. Insert the sealing cap into the mounting hole.



9. Stick the adhesive labels specifying the contrast modules combinations to the front of the condenser.
10. If necessary: *Align the contrast module [▸ 134]*.

19.7.2 Aligning the iHMC Module in the Condenser

Parts and Tools
- 2x Hex key, 1.5 mm

Prerequisite
- ✓ The microscope is operational.
- ✓ The iHMC module is installed.

Procedure
1. Turn the clamping ring on the condenser to the left.
2. Lift the clamping ring.
3. Turn the condenser 90° to the right until it locks into position.
   → The change position is on the right-hand side of the carrier for transmitted light illumination.
4. Swivel the iHMC position of the condenser into the change position.
5. Precenter the iHMC module in the mount, based on visual judgment.
6. Turn the condenser back to its initial orientation until it snaps into position.
7. Turn the clamping ring to the right for locking.

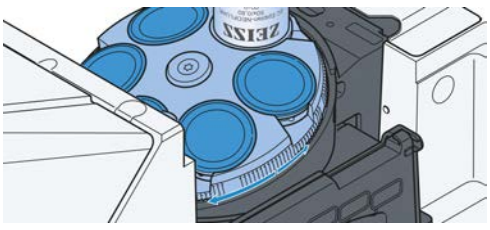
The diaphragm of the iHMC module can be positioned individually in the mount according to the desired orientation of the relief impression in the field of view. Different variants to the examples (changing the position shown by up to 45°) are possible. If iHMC is intended for several magnifications, the diaphragms of the iHMC modules should be positioned in an analogous manner, since the relief impression then has the same orientation for all magnifications.

19.7.3 Aligning the iHMC Diaphragm

Parts and Tools
- Auxiliary microscope
- 2x Hex key, 1.5 mm

Prerequisite
- ✓ The microscope is operational.
- ✓ *The iHMC module in the condenser is aligned [▸ 134]*.

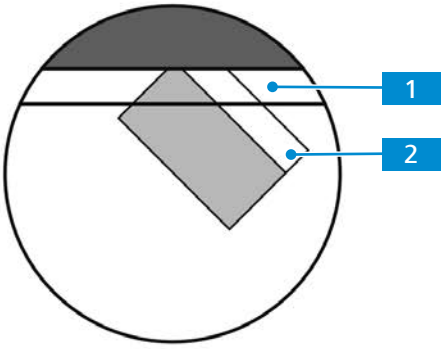
Procedure
1. Turn the iHMC objective into the light path.



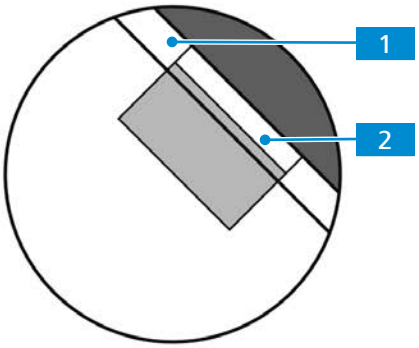
2. Place a typical sample in a cultivation dish on the stage.
3. *Focus the sample [▸ 77]*.

4. Replace one eyepiece with an auxiliary microscope.

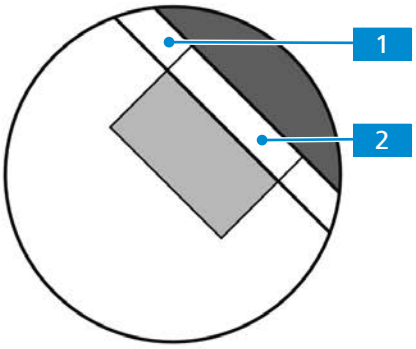
   → The rear focal plane of the objective is visible through the auxiliary microscope.



5. Adjust the eye lens of the auxiliary microscope to bring the zone plate of the objective 1 and the iHMC diaphragm 2 in focus.
6. Turn the ring of the iHMC objective 1 until the zone plate is aligned parallel to iHMC diaphragm 2.



7. Use the hex keys to move the iHMC diaphragm until the zone plate of the objective 1 and the iHMC diaphragm 2 line up completely in middle position.



8. Remove the auxiliary microscope.
9. Attach the condenser sticker for the iHMC magnification to the corresponding surface for the condenser position used.

19.8 Sliders

Sliders are mechanical parts that can receive one or more optical components, such as filters, polarizers, etc., which are then brought into the beam path manually or by means of a linear drive.

19.8.1 Assembling the Mounting Adapter for Third-Party Components

⚠ CAUTION

Important notes on laser safety

The operator himself is responsible for laser safety in the coupling of lasers into the microscope via the mounting adapter for third-party components. No laser protection measures were taken or implemented by the manufacturer.

The operator must himself implement the required laser protection measures stipulated in IEC 60825-1:2014 “Safety of laser products” and national requirements including the laser warning labels on the microscope.

The manufacturer accepts no liability for the use of the mounting adapter for third-party components with lasers and no warranty claims for destruction caused by the laser. If the required laser protection measures are not implemented by the user or operator, skin or eye injury may result, depending on the laser used (power, wavelength). If lasers are coupled into the microscope via the mounting adapter for third-party components, health and safety stipulations and legal provisions must be adhered to. The coupling of laser beams may lead to damage of the microscope optics.

The operator is informed in advance by ZEISS with an information sheet about possible dangers that can occur due to improper use of lasers and list safety measures that must be observed to prevent accidents. This document must be read and signed by the user and returned to ZEISS. The delivery of the mounting adapter for third-party components is only possible on presentation of the signed document.

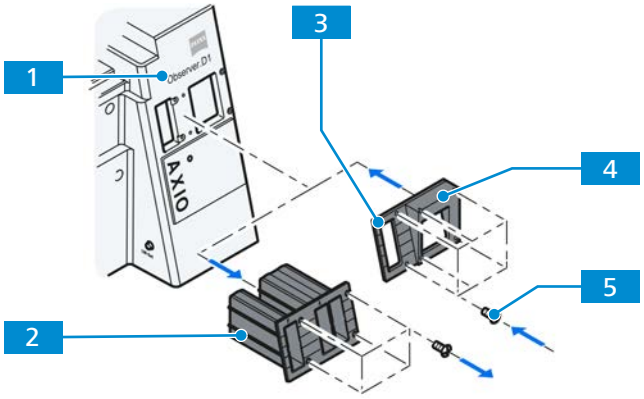


Fig. 46: Installing the mounting adapter for third-party components

1	Stand	2	Cover
3	Mounting adapter	4	Wedge of the mounting adapter
5	Fixing screw (4x)		

Parts and Tools

- Hex key, 3.0 mm

Procedure

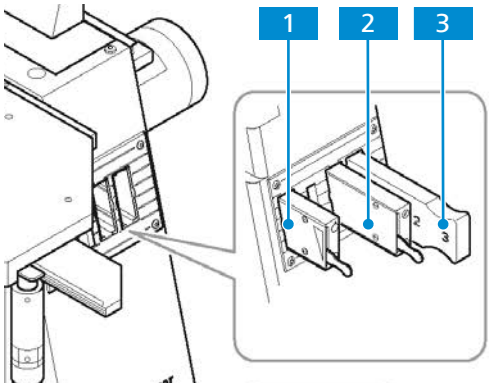
1. At the right-hand side of the stand, screw out the adapter opening cover's four fixing screws.
2. Screw out the cover's four fixing screws 5.
3. Remove the cover 2 from the stand 1. Pull it to the right.
4. Attach the mounting adapter 3 to the stand openings.

5. Screw in the four fixing screws.
6. Insert third-party component over the wedge 4 of the mounting adapter into the stand.

19.8.2 Inserting Sliders

Procedure

1. Take the slider with the label pointing towards you.
2. Insert the slider into the designated slot until it engages noticeably.



1 ▪ Luminous-field diaphragm
▪ Fluorescence attenuator slider

2 Aperture stop slider

3 Filter slider

19.9 TFT Display on the Axio Observer 7

The TFT display enables operation and configuration of the microscope and utilize optional functions via touch screen. The TFT display can be attached directly to the *microscope stand [▸ 138]* or in a *docking station [▸ 138]*.

19.9.1 Installing the TFT Display

⚠ WARNING

Risk of electric shock

Contact with live parts may result in death or severe injury.

- Always switch off the microscope and unplug the mains cable before performing any electric connection or working on electric components.

19.9.1.1 Installing the TFT Display to the Microscope Stand

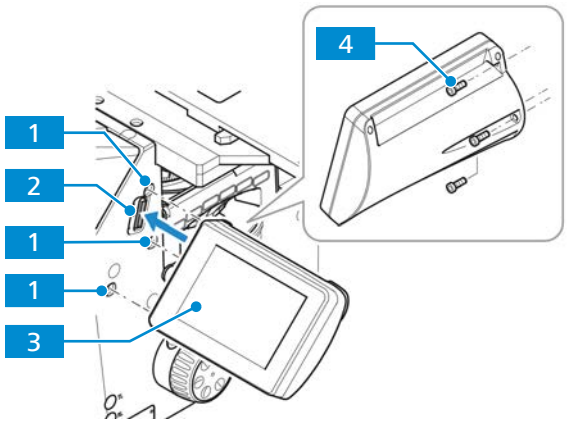


Fig. 47: Installing the TFT display

1	Mounting holes (3x)	2	Display connector
3	TFT display	4	Fixing screw (3x)

Parts and Tools
- Hex key, 3.0 mm

Prerequisite
- ✓ The microscope is switched off and the mains cable is unplugged.

Procedure
1. At the right-hand side of the stand, remove the cover caps from the display connector 2 and the display mounting holes 1.
2. Insert the supplied spacer disks into the display mounting holes.
3. Attach the display 3 to the stand, matching its connector precisely to the corresponding socket at the stand.
4. Screw the display with the supplied fixing screws 4 to the stand.

19.9.1.2 Installing the TFT Display to the Docking Station

If it is inconvenient to operate the microscope stand from the right side, the functions of the touchscreen TFT display, the right control ring and the focus drive on the right can be performed using the docking station detached from the stand. The functions correspond to those of the stand. When using the PeCon Incubator XLmulti S1, the docking station must be used as otherwise the TFT display cannot be mounted on the stand.

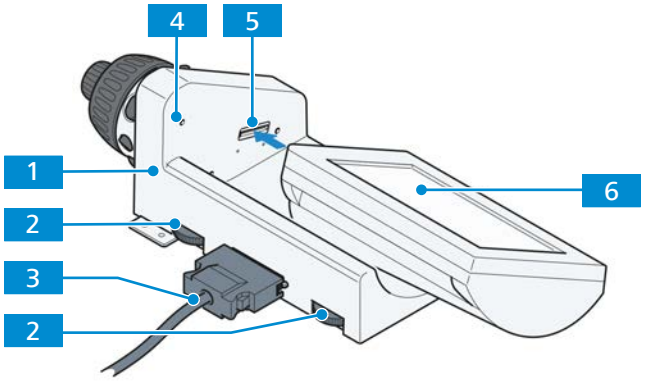


Fig. 48: Installing the TFT display

1	Docking station	2	Knurled wheel (2x)
3	Connection cable	4	Mounting holes (3x)
5	Display connector	6	TFT display

Prerequisite

- ✓ The microscope is switched off.
- ✓ The mains cable is unplugged.
- ✓ The plug-in module for the docking station 6 has been installed at the stand by ZEISS.

Procedure

1. Attach the display to the docking station 1, matching its connector precisely to the corresponding display connector 5 at the station.
2. Screw the display with the supplied fixing screws into the mounting holes 4 of the station.
3. Connect the docking station to the dedicated plug-in module of the stand's connector panel. Use the connection cable 3.

> **Info**
>
> The angle of the display can be adjusted using the two knurled wheels 2 at the lower rear side of the docking station.

19.9.2 Screen Layout

Purpose The controls and information displays are arranged on a series of tabs. A page on the TFT display is generally split into the three main areas

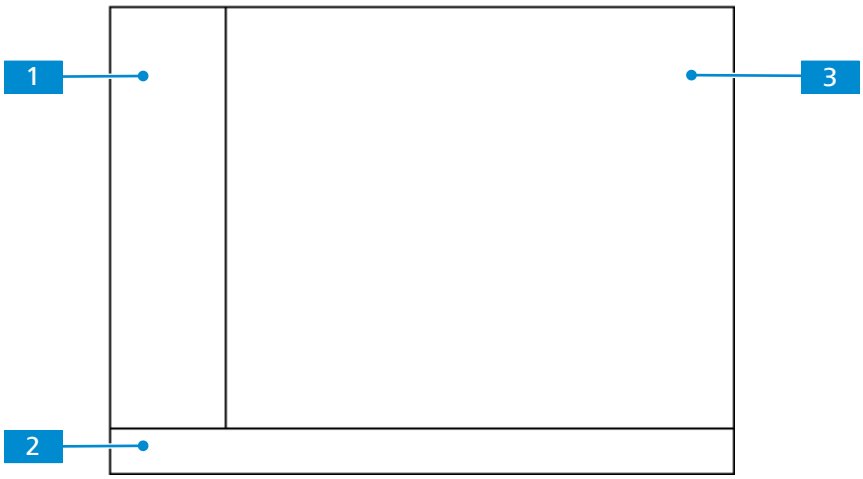


Fig. 49: TFT display -Screen layout

1	Navigation bar	2	Status bar
3	*Control area [▸ 172]*		

19.9.2.1 Navigation Bar

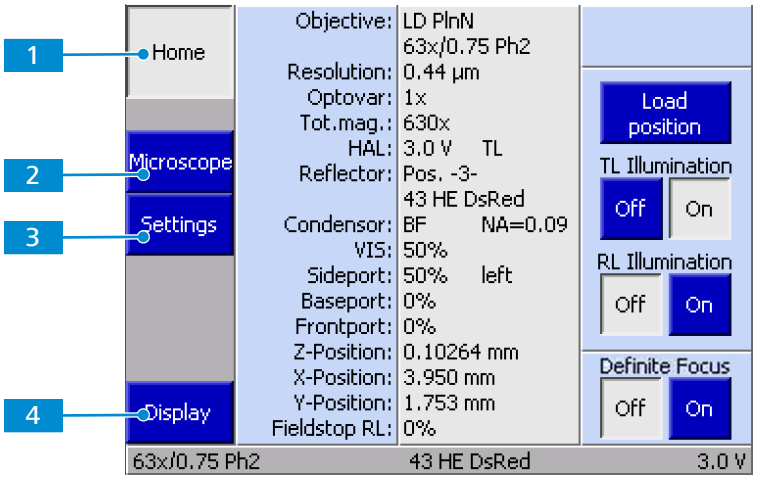


Fig. 50: TFT Display - Navigation bar

1	Home	2	Microscope
3	Settings	4	*Display [▸ 171]*

19.9.2.1.1 Home Page

After switching on, the microscope is initialized. This process takes a few seconds. Under normal circumstances, the **Home** page will then be displayed.

If any coded or motorized microscope components have been changed or removed while the microscope was switched off, the new components will require configuration after switching on.

All menu pages can be accessed using the buttons on the navigation bar on the left.

The middle section of the controls area displays the configuration. All coded and motorized control elements which are recognized during initialization are shown in the status field, otherwise the "-" character will be displayed.

The control elements are arranged from top to bottom according to their significance.

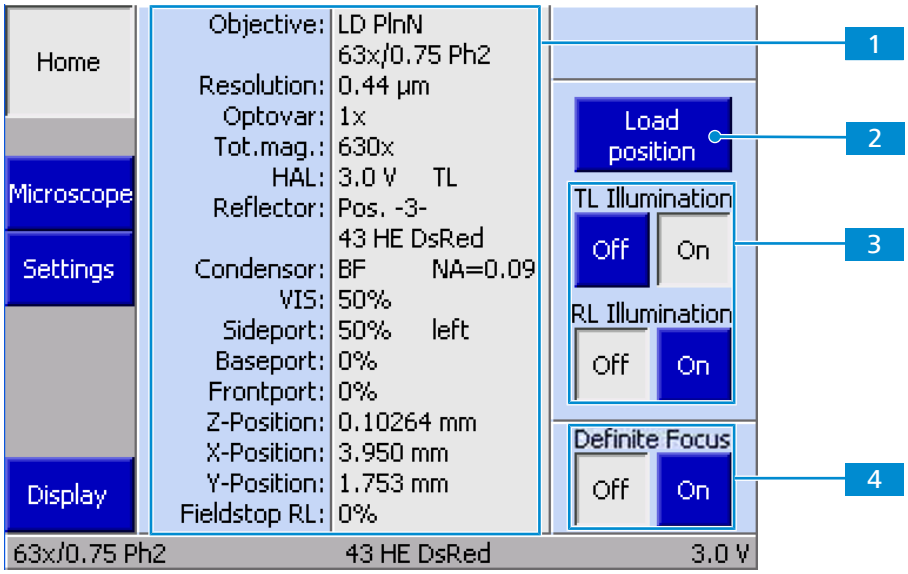


Fig. 51: Home page, typical for a Bio/Med stand type

1	Status field, displays the configuration	2	**Load position** *button [▸ 141]*

3 *TL or RL illumination [▸ 142]*, **Off**/**On** switches

4 *Definite Focus [▸ 142]*, **Off**/**On** switches

If the system does not have Definite Focus, the **Make It Visible!** *button [▸ 143]* will appear in place of the Off and On switch.

19.9.2.1.1.1 Load Position Button

When the **Load position** button is pressed, the nosepiece moves to the load position.

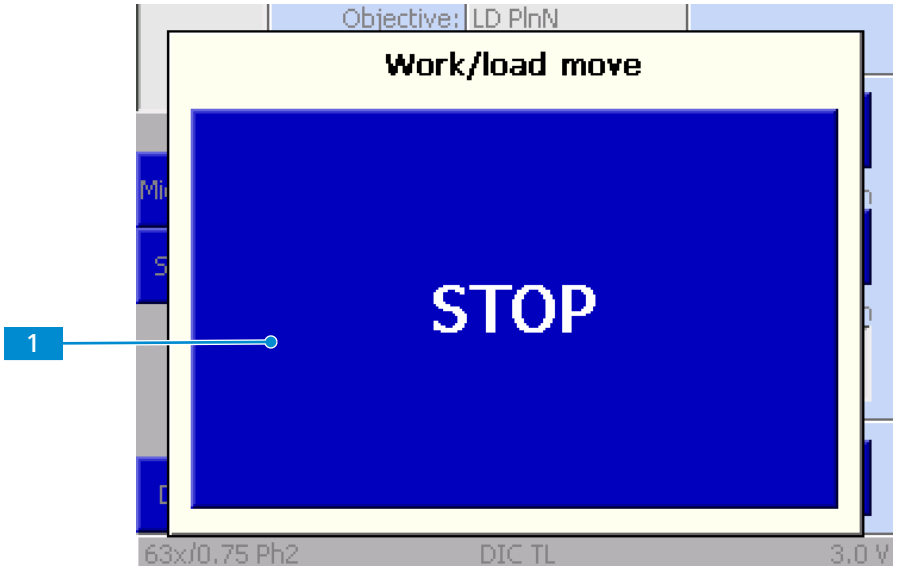


*Fig. 52: **STOP** button*

1 **STOP** button

Nosepiece movement can be interrupted by pressing **Stop** 1.

Once the loading position has been reached, the load position pop-up window containing the following controls appears:

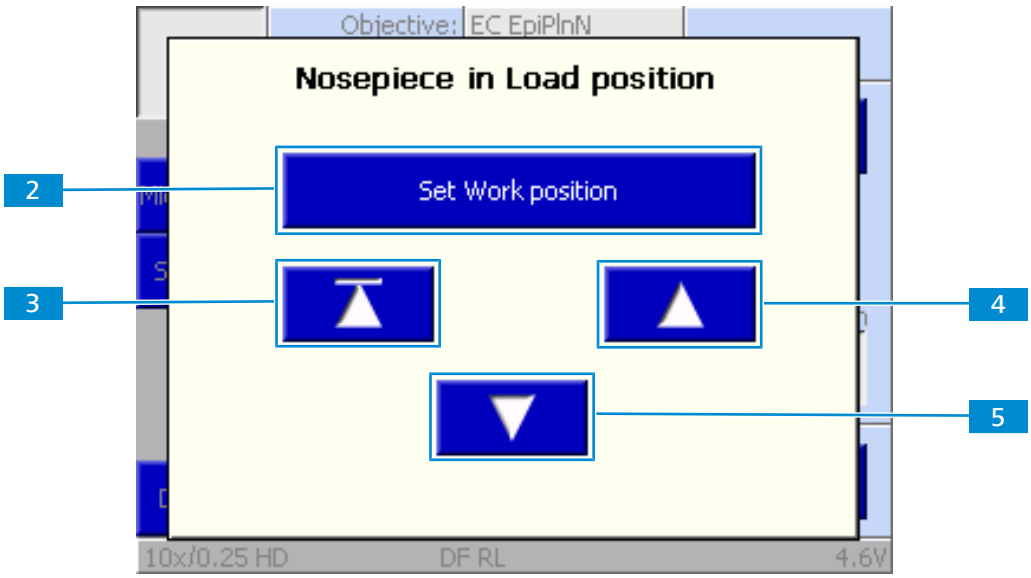


Fig. 53: Nosepiece in load position

2 **Set Work position** button

3 Back to work position button

4 Upwards button

5 Downwards button

No.	Name	Function
1	**STOP** button	Interrupts the nosepiece movement.
2	**Set Work position** button	Sets the current nosepiece position as the work position.
3	Back to work position button	Moves the nosepiece back to the work position.
4	Upwards button	Moves the nosepiece upwards towards the working position until the button is released.
5	Downwards button	Moves the nosepiece downwards until the button is released (up to nosepiece limit stop).

Tab. 4: Description of the controls

When the focusing drive is used in a regular way, a pop-up window will appear as soon as the upper or lower limit stop is reached.

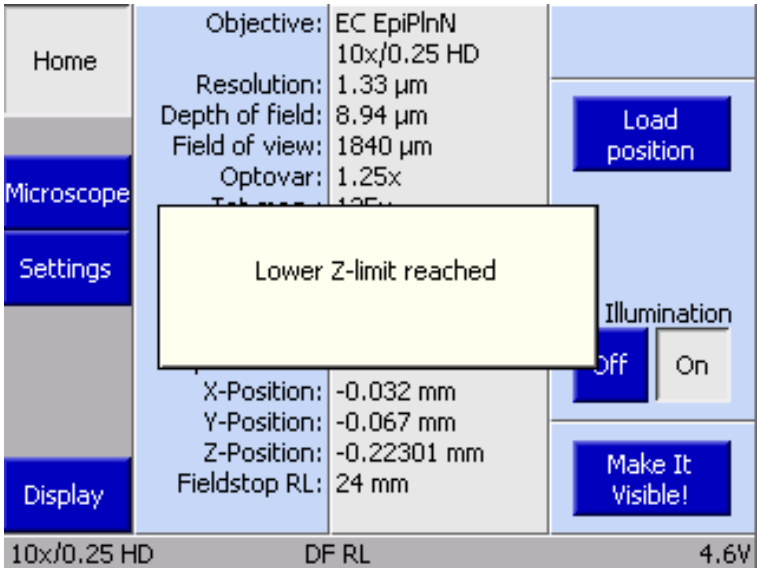


*Fig. 54: **Lower Z-limit reached** pop-up window*

19.9.2.1.1.2 TL/RL Illumination Switch

The **Off** and **On** switches open or close the shutter for reflected light (RL) and transmitted light (TL) or switch the illuminators on and off.

19.9.2.1.1.3 Definite Focus Switch

The **Off** and **On** switches switch Definite Focus on and off.

If the system does not have Definite Focus, the *Make It Visible! [▸ 143]* button will appear in place of the **Off** and **On** switch.

19.9.2.1.1.4 Make It Visible! Button

If the microscope is so poorly adjusted that no image of the sample is visible, this button can be used to reset the microscope to a standard state in which the sample is visible.

- TL light source is set to medium brightness (3 V)
- Aperture stop is opened
- TL shutter open, RL shutter closed
- Motorized condenser is switched to brightfield
- Reflector turret is rotated to the nearest brightfield position
- Beam path is set to 100% vis

Only materials

- RL light source is set to medium brightness
- TL shutter closed
- RL shutter opened
- Reflector turret in brightfield reflected light position (alternatively contrast module)
- Reflected light luminous-field diaphragm opened
- Reflected light aperture stop opened
- Optovar turret in position 1: Optovar 1x
- Sideport in position 1 (100% vis)
- Baseport in position 2 (100% vis)

The nosepiece position (and, if entered, the objective) will be shown on the left of the status bar, the halogen illuminator voltage on the right.

19.9.2.1.2 Microscope Page

Purpose The Microscope page is used to control the microscope functions.

Call page **Home > Microscope**

The following pages can be accessed via the **Microscope** page:

- **Control** *page [▸ 143]*
- **Automatic** *page [▸ 150]*
- **XYZ** *page [▸ 151]*
- **Incubation** *page [▸ 154]*

19.9.2.1.2.1 Control Page

Call page **Home > Microscope > Control**

Different tabs will be displayed on the **Control** page depending on the *stand type selected [▸ 165]* in **Settings -> User -> Stand type**.

The following tabs can be accessed via the **Control** page:

- **Objectives** *tab [▸ 144]*
- **Colibri-LEDs** *tab [▸ 145]*
- **Reflector** *tab [▸ 145]*
- **Virtual reflector** *tab [▸ 146]*
- **Optovar** *tab [▸ 147]*
- **Light path** *tab [▸ 147]*
- **F/A** *tab [▸ 148]*
- **Magnification** *tab [▸ 149]*
- **Contrast** *tab [▸ 150]*

19.9.2.1.2.1.1 Objectives Tab

Call page **Home > Microscope > Control > Objectives**

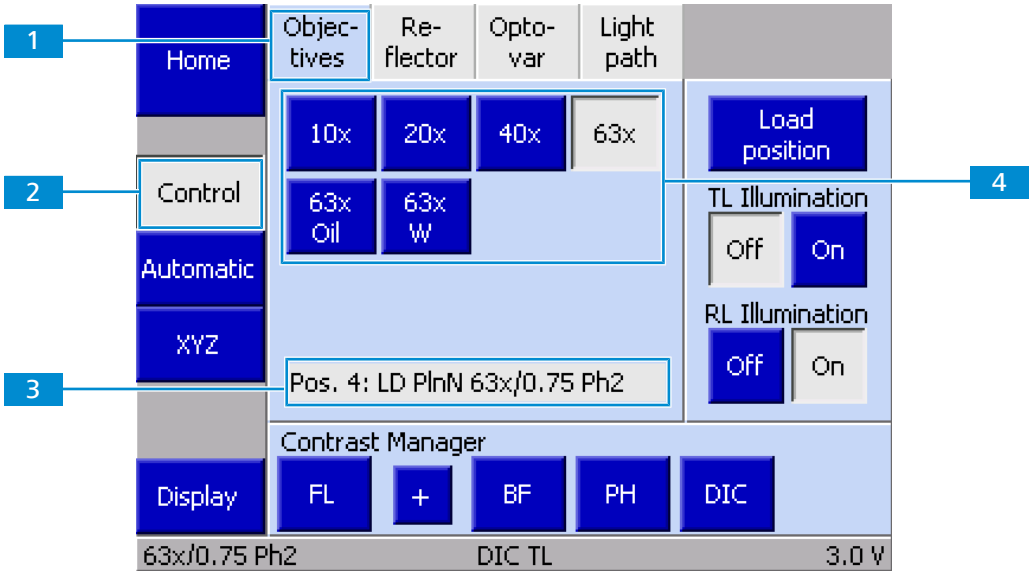


*Fig. 55: **Objectives** tab*

1	**Objectives** tab	2	**Control** button
3	Display field, showing the current nosepiece position and the objective type	4	Objective buttons for changing the objective position, labeled with the magnification of the objective

For objective positions which have already been configured, the magnification and, where applicable, the following additional information is displayed:

- Oil - Oil immersion objective
- W - Water immersion objective
- Imm - Immersion objective

Info

If the Light Manager is active, the brightness will be readjusted automatically when the objective is changed.

If a contrast technique was set in the Contrast Manager before changing the objective, this will automatically adapt the process to the new objective (i.e. the condenser and reflector turret positions may change - contrast adjustment). If the contrast technique is not available for the objective, the system will switch to brightfield.

19.9.2.1.2.1.2 Colibri LEDs Tab

Call page **Home > Microscope > Control > Colibri LEDs**

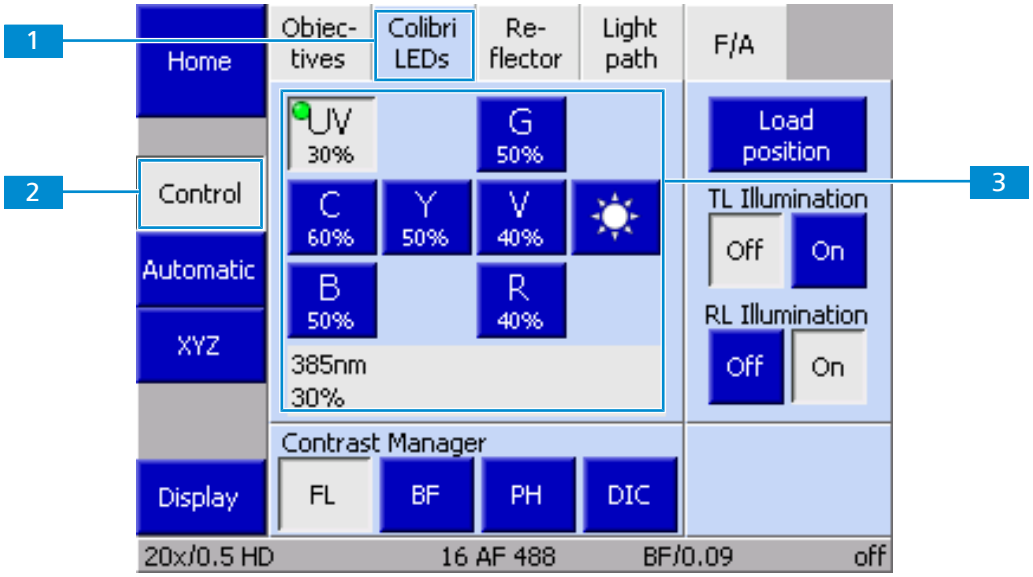


*Fig. 56: **Colibri LEDs** tab*

1	**Colibri LEDs** tab	2	**Control** button
3	Controls and display field of the Colibri LEDs		

19.9.2.1.2.1.3 Reflector Tab

Call page **Home > Microscope > Control > Reflector**

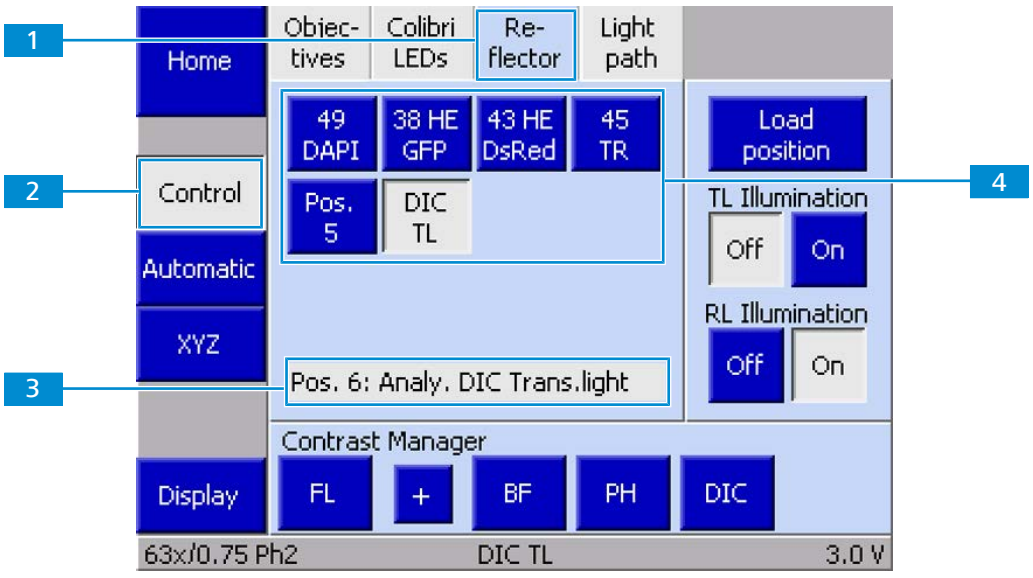


*Fig. 57: **Reflector** tab*

1	**Reflector** tab	2	**Control** button

3 Display field, showing the current reflector position and the reflector module type

4 Reflector module buttons for changing the reflector position, labeled with the filter combination or reflector module type (only for reflector modules which have already been configured)

Reflector modules which have already been configured are identified by the description on the button.

Info

This tab will not be available if no motorized reflector turret is installed. The active reflector module will only be displayed on the status page.

19.9.2.1.2.1.4 Virt. Reflector Tab

Call page **Home > Microscope > Control > Virt. Reflector**

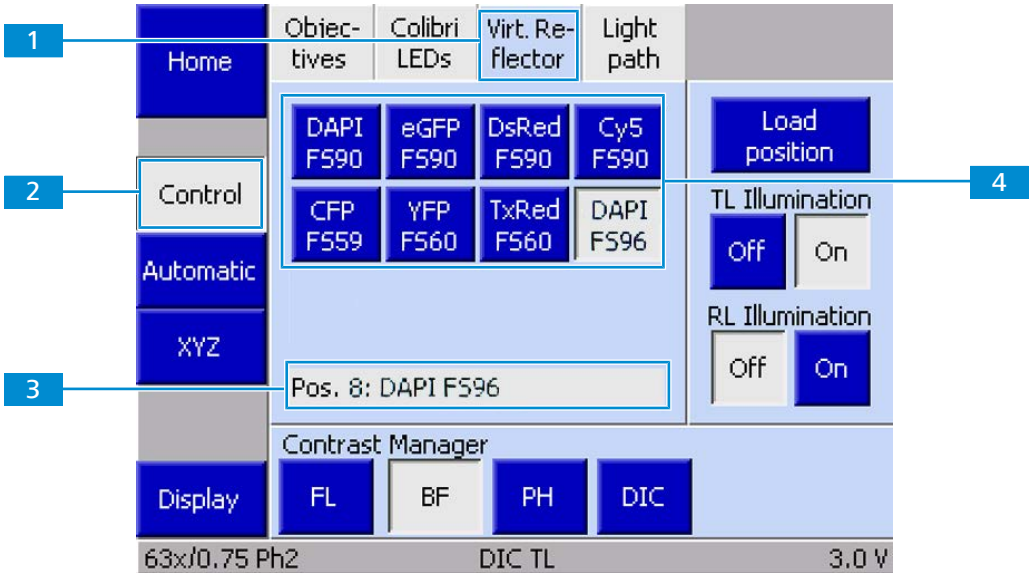


*Fig. 58: **Virt. Reflector** tab*

1 **Virt. Reflector** tab

2 **Control** button

3 Display field, showing the current virtual reflector position and the virtual reflector type

4 Virtual reflector buttons for changing the virtual reflector position, labeled with the filter combination

Instructions for the virtual reflector wheel can be found in the separate Quick Reference Guide for the filter wheel excitation 8-pos. mot. and dual filter wheel mot.

19.9.2.1.2.1.5 Optovar Tab

Call page **Home > Microscope > Control > Optovar**

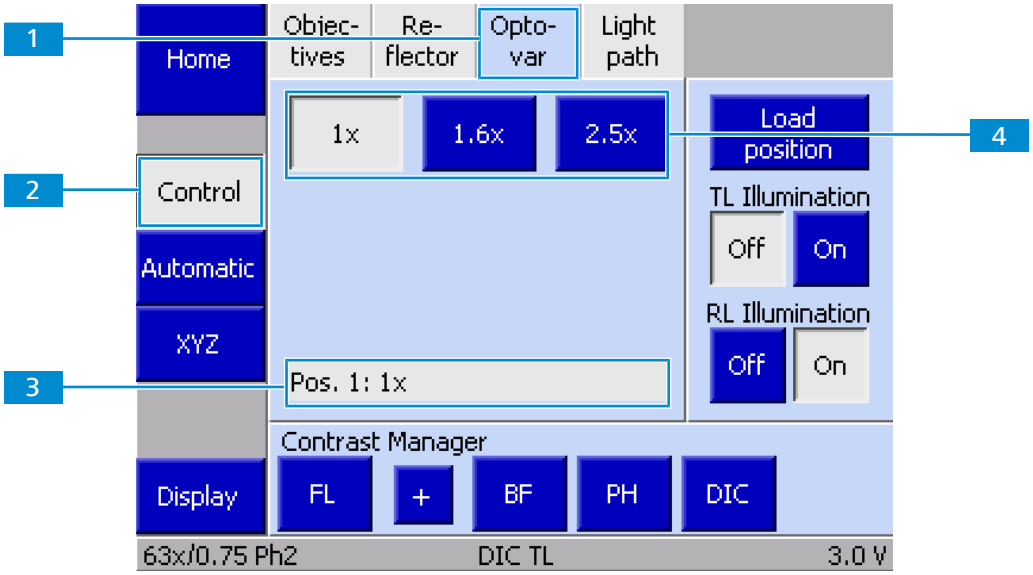


*Fig. 59: **Optovar** tab*

1	**Optovar** tab	2	**Control** button
3	Display field, showing the current optovar position and the magnification	4	Optovar buttons for changing the optovar position, labeled with the magnification

Info

This tab will not be displayed if there is no motorized Optovar turret installed.

19.9.2.1.2.1.6 Light Path Tab

Below the **Light path** tab, the light path (yellow lines) of the microscope is displayed schematically. The configuration of the light path is determined during initialization of the microscope.

Call page **Home > Microscope > Control > Light path**

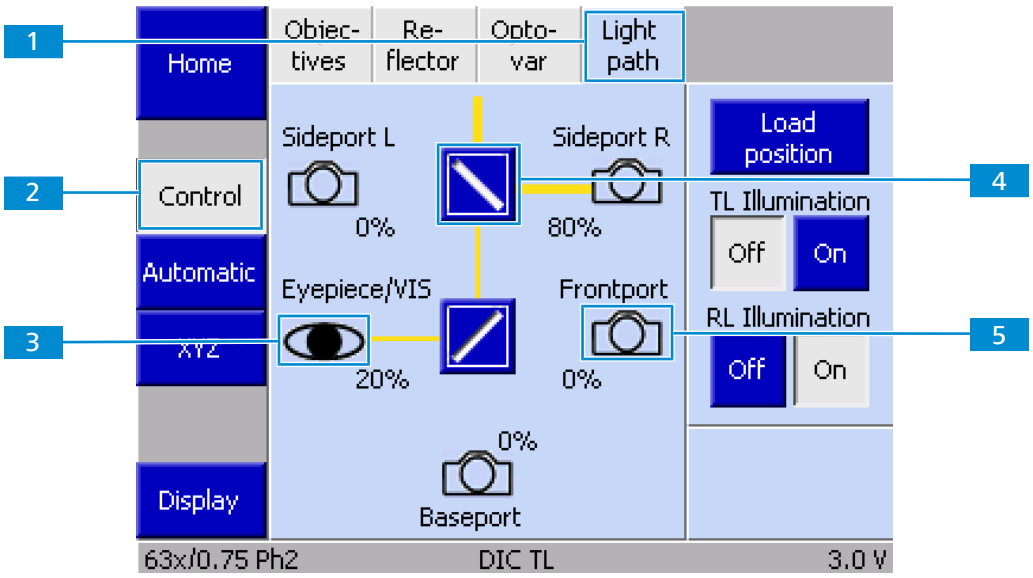


*Fig. 60: **Light path** tab*

1	**Light path** tab	2	**Control** button

3 **Eyepiece/VIS** icon

Pressing this icon will cause the maximum possible amount of light to be transmitted to this item.

4 **Beam splitter** button

Pressing this button switches through the available splitting ratios.

5 **Port** icon (Sideport L/R, Frontport, Baseport)

Pressing one of the icons will cause the maximum possible amount of light to be transmitted to this item.

19.9.2.1.2.1.7 F/A Tab

The **F/A** tab is used to configure the motorized iris diaphragm slider for luminous-field diaphragm (field stop) and the aperture stop..

Call page **Home > Microscope > Control > F/A**

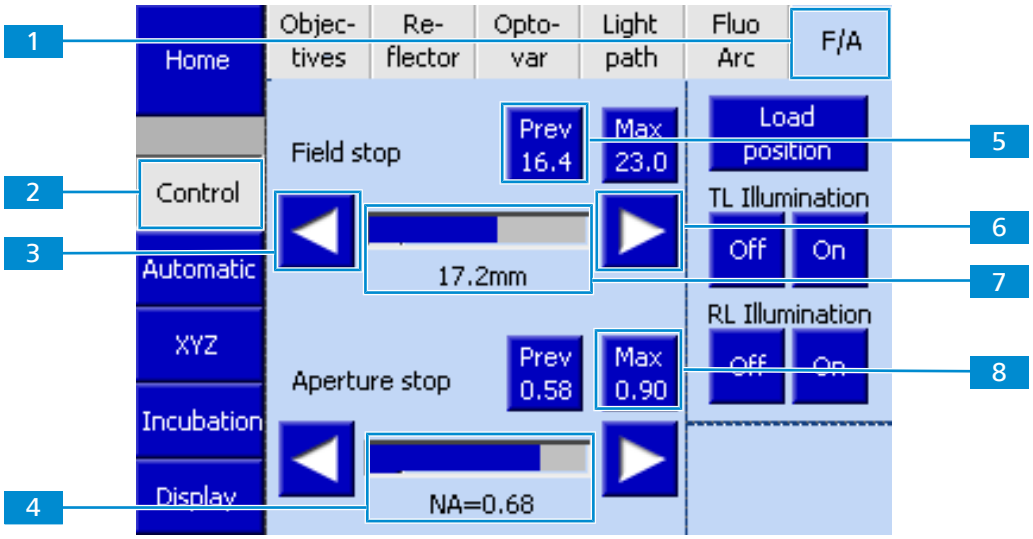


*Fig. 61: **F/A** tab*

1 **F/A** tab

2 **Control** button

3 **Arrow** button, closes the diaphragm (stop)

4 Bar display with current value of the aperture diaphragm

5 **Prev** button, resets the diaphragm to the previous value

6 **Arrow** button, opens the diaphragm (stop)

7 Bar display with current value of the luminous-field diaphragm

8 **Max** button, resets the diaphragm to the maximum value

Info

If a motorized FL attenuator is fitted, it cannot be set via the TFT display. The lower aperture diaphragm display is then not available.

19.9.2.1.2.1.8 Magnification Tab

Call page **Home > Microscope > Control > Magnification**

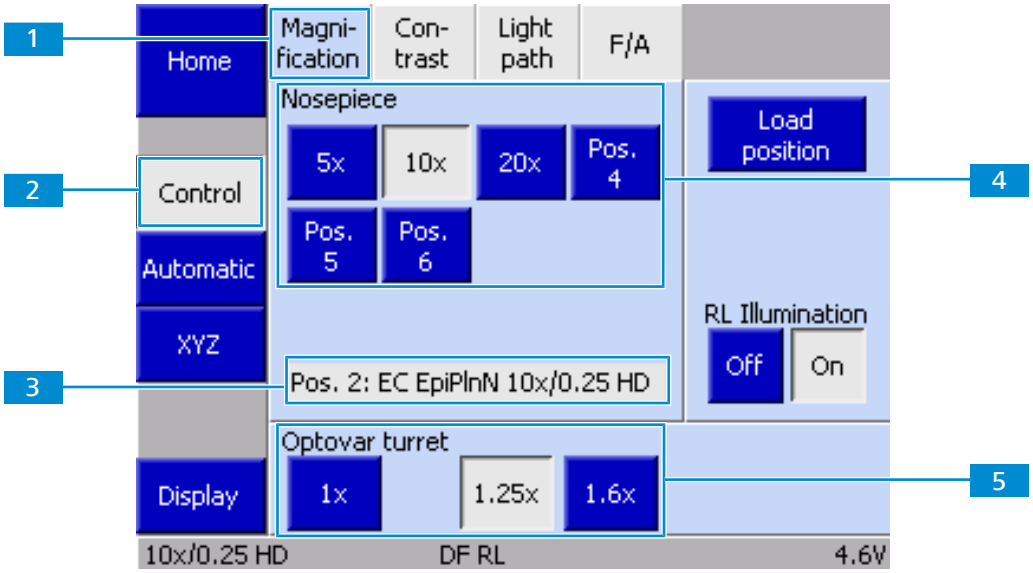


*Fig. 62: **Magnification** tab*

1 **Magnification** tab	**2** **Control** button
3 Display field, showing the current nosepiece position and the objective type	**4** Objective buttons for changing the objective position, labeled with the magnification of the objective
5 Optovar buttons for changing the optovar position, labeled with the magnification	

For objective and/or Optovar positions which have already been configured, the magnification and, where applicable, the following additional information is displayed:

- Oil - Oil immersion objective

Info

This tab will not be displayed if there is no motorized optovar turret installed.

If the Light Manager is active, the brightness will be readjusted automatically when the objective is changed.

If a contrast technique was set in the Contrast Manager before changing the objective, this will automatically adapt the process to the new objective (i.e. the reflector and condenser turret positions may change - contrast adjustment). If the contrast technique is not available for the objective, the system will switch to brightfield.

19.9.2.1.2.1.9 Contrast Tab

Call page **Home > Microscope > Control > Contrast**

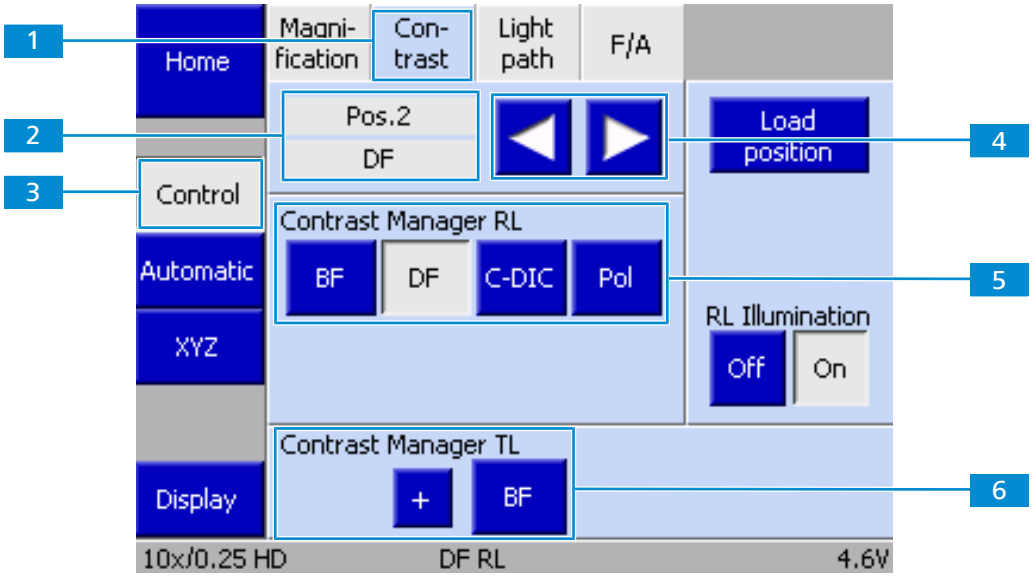


*Fig. 63: **Contrast** tab*

1 **Contrast** tab	**2** Display field, showing the current reflector position and the contrast module type
3 **Control** button	**4** **Arrow** buttons for changing the reflector position, back or forth
5 Buttons of the Contrast Manager RL, max. 6 positions (depending on the reflector modules configured)	**6** Buttons of the Contrast Manager TL

Info

This tab will not be displayed if there is no motorized reflector turret installed. The active reflector module will only be displayed on the status field.

19.9.2.1.2.2 Automatic Page

Call page **Home > Microscope > Automatic**

The following tab can be accessed via the **Automatic** page:

- **Soft Keys** *tab [▸ 151]*

19.9.2.1.2.2.1 Soft Keys Tab

Purpose This tab is used to access hardware which have been previously generated, named and made available using the AxioVision software program.

Function These scripts are activated by touching the relevant button on the TFT screen.

Call page **Home > Microscope > Automatic > Soft Keys**

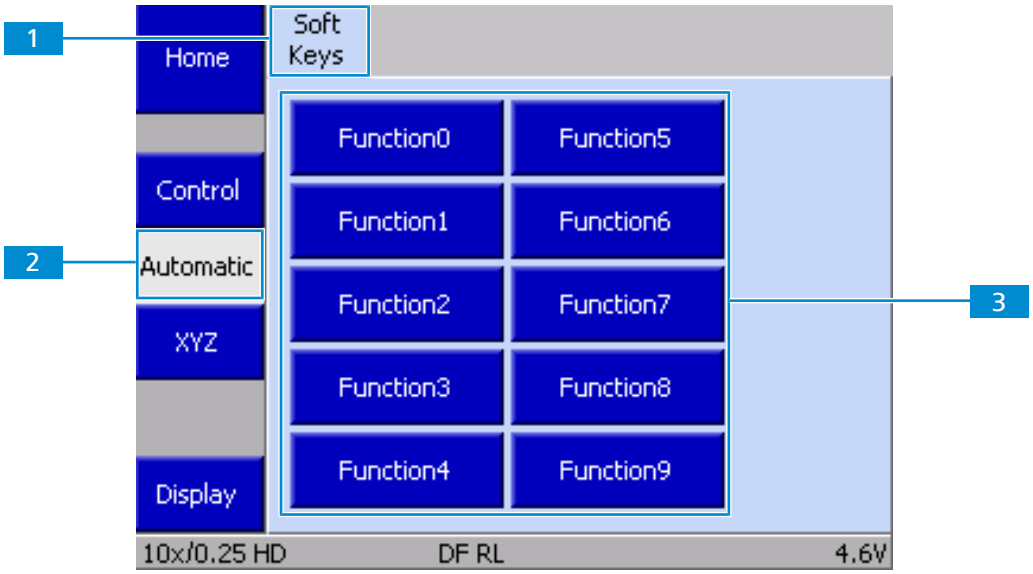


*Fig. 64: **Soft Keys** tab*

1	**Soft Keys** tab	2	**Automatic** button
3	Soft Keys		

19.9.2.1.2.3 XYZ Page

The display of the **XYZ** page depends on the microscope stage used.

- Motorized stages (only CAN bus stages directly connected to the stand):
  all settings are available
- Manual stage:
  Z focus drive settings only (no XY controls are available), **Measure** tab is not available
- Manual stage / manual Z focus drive:
  XYZ page is not available

The system detects whether a motorized stage is installed during microscope initialization. The stage should therefore only be changed when the microscope is switched off.

Call page **Home > Microscope > XYZ**

The following tabs can be accessed via the **XYZ** page:

- **Position** *tab [▸ 152]*
- **Measure** *tab [▸ 153]*
- **Definite Focus** *tab [▸ 154]*

19.9.2.1.2.3.1 Position Tab

The controls area of the **Position** tab is divided into three blocks.

If you are not using a motorized stage, the XY position displays are replaced by a **Start** *button [▸ 153]*.

Call page **Home > Microscope > XYZ > Position**

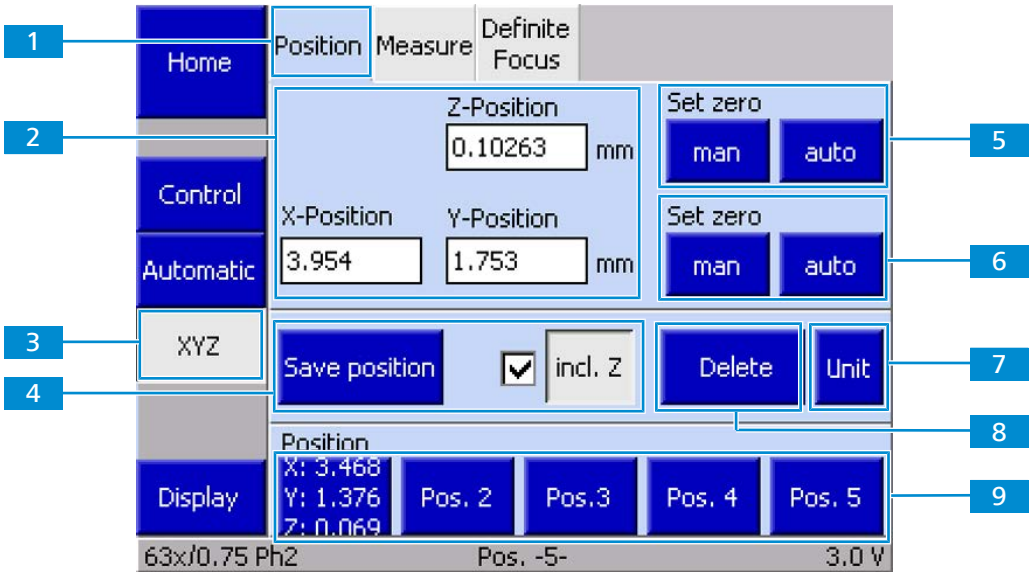


*Fig. 65: **Position** tab*

1 **Position** tab

2 **Z-Position**, **X-Position** and **Y-Position** display fields, display the current X/Y/Z positions.

3 **XYZ** button

4 **Save position** button, opens the **Save current positions temporarily** pop-up window to save the current X/Y/Z position temporarily to one of the five **Position** buttons (Z position only, if the checkbox **incl. Z** is activated).

5 **Set zero** field for Z position:

- **man** button: Manually sets the zero point. The current position is defined as the zero point and the display is set to zero.
- **auto** button: Automatically sets the zero point. The nosepiece moves to the end position which has been defined as the zero point. The display is then set to zero.

6 **Set zero** field for X/Y positions:

- **man** button: Manually sets the zero point for X/Y. The current position is defined as the zero point and the display is set to zero.
- **auto** button: Automatically sets the zero point. The stage moves to the end position which has been defined as the zero point. The display is then set to zero.

7 **Unit** button, selects unit [mm] or [inch] for the X/YZ coordinates

8 **Delete** button, deletes the set of coordinates of the selected **Position** button.

9 **Position** buttons (**Pos.1** to **Pos.5**), moves to the saved position by pressing the button. If coordinates have already been assigned to a button, the X/Y/Z values will be displayed, otherwise the position number will be displayed.

19.9.2.1.2.3.2 Measure Tab

Purpose The Measure tab can be used to perform simple distance measurements in millimeters (mm).

Three options are available for these measurements:

- distance between two manually set positions
- distance between a manually set position and a defined position
- distance between two defined positions

This tab is only accessible if a motorized (CAN bus) stage is used. Otherwise, the **Start** button and a display for the Z-distance **ΔZ** are displayed on the **Position** *tab [▸ 152]*.

Call page **Home > Microscope > XYZ > Measure**

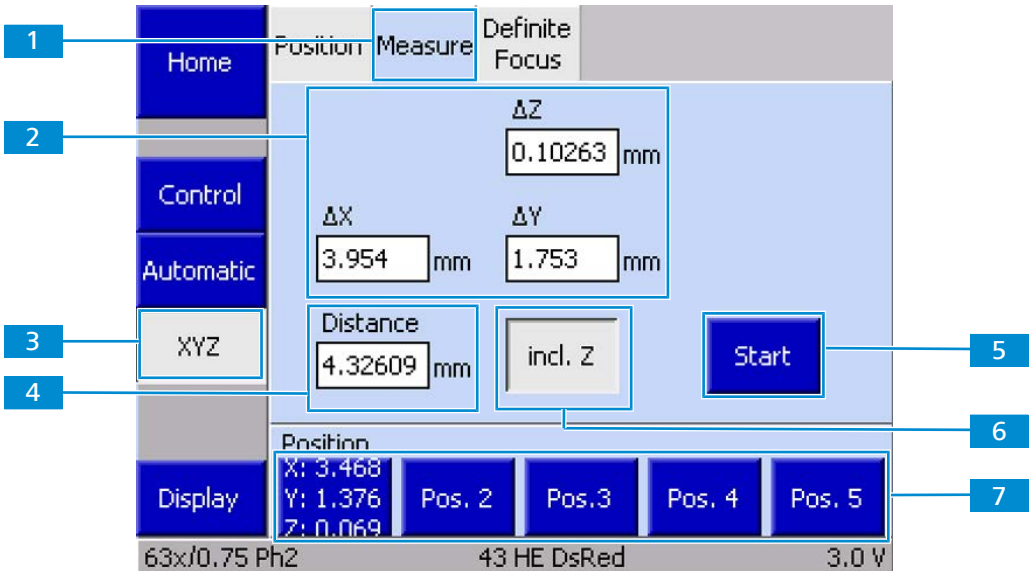


*Fig. 66: **Measure** tab*

1 **Measure** tab

2 **ΔZ**, **ΔX**, **ΔY** display fields, display the measured values

3 **XYZ** button

4 **Distance** field

5 **Start** button, sets the **ΔZ**, **ΔX**, **ΔY** display fields to zero. All stage movements are displayed in the appropriate display field.

6 **incl. Z** button, activates the Z distance measurement.

7 **Position** buttons (**Pos.1** to **Pos.5**), moves to the saved position by pressing the button. If coordinates have already been assigned to a button, the X/Y/Z values will be displayed, otherwise the position number will be displayed.

19.9.2.1.2.3.3 Definite Focus Tab

The **Definite Focus** tab can be used to switch on or off the focus stabilization of the **Definite Focus** function.

Call page **Home > Microscope > XYZ > Definite Focus**

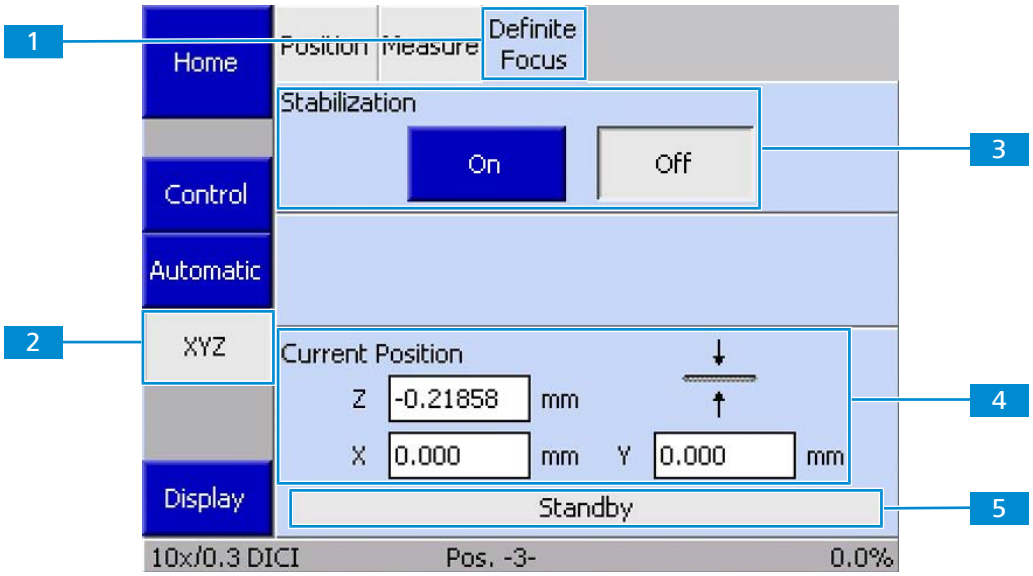


*Fig. 67: **Definite Focus** tab*

1	**Definite Focus** tab
2	**XYZ** button
3	**Stabilization** field, activates/deactivates the focus stabilization function by pressing the **On/Off** button.
4	**Current Position** display field, displays the current coordinates.
5	**Standby** button

19.9.2.1.2.4 Incubation Page

The **Incubation page** is used to control incubation components and thermostats connected to the microscope.

Call page **Home > Microscope > Incubation**

The following tabs can be accessed via the **Incubation** page:

- **Incubation** *tab [▸ 155]*
- **Y-Module** *tab [▸ 156]*

19.9.2.1.2.4.1 Incubation Tab

The **Incubation** tab lists all fitted incubation components.

Call page **Home > Microscope > Incubation > Incubation**

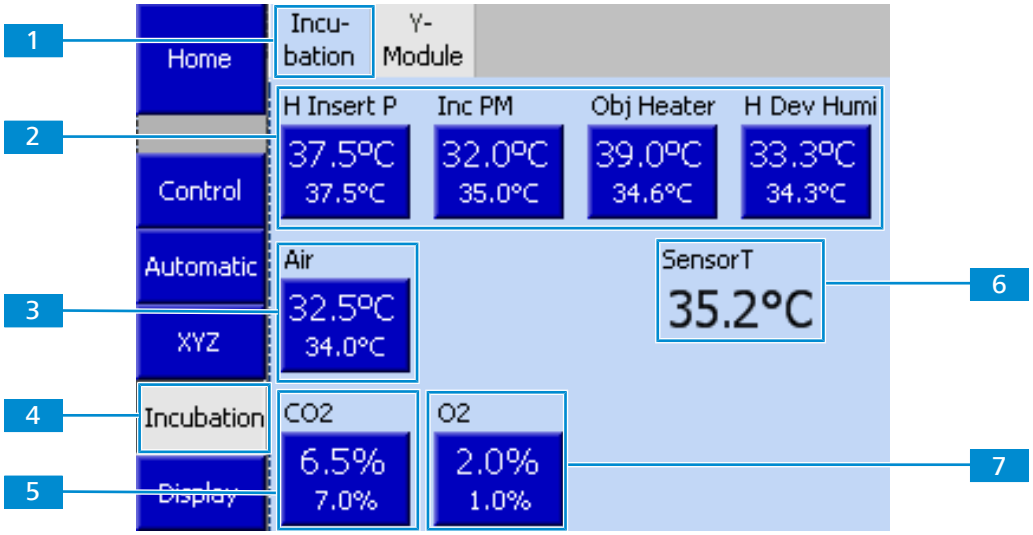


*Fig. 68: **Incubation** tab*

1 **Incubation** tab

2 Buttons of the installed heating components, opens the pop-up window to control the appropriate component

The buttons display the set point (bottom) and the actual value (top) for the temperature of the controlled component.

3 **Air** button, opens the pop-up window to control the component

The button displays the set point (bottom) and the actual value (top) for the temperature of the controlled component.

4 **Incubation** button

5 **CO2** button, opens the pop-up window to control the component

The button displays the setpoint (bottom) and actual value (top) for the controlled component.

6 **SensorT** button, displays the sensor temperature.

7 **O2** button, opens the pop-up window to control the component

The button displays the setpoint (bottom) and actual value (top) for the controlled component.

Example H Insert P

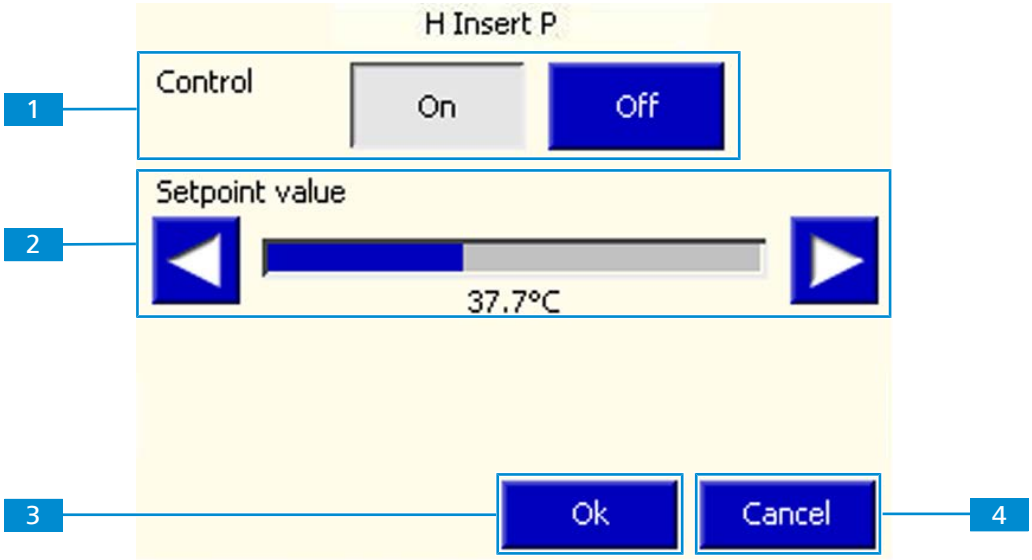


*Fig. 69: **H Inser P** pop-up window*

1 **Control** field with **On/Off** buttons, switches the component on/off.

2 **Setpoint value** field, sets the value using the **Arrow** buttons, the set value is shown below the bar display.

3 **Ok** button, closes the window with accepting the changes.

4 **Cancel** button, closes the window without accepting the changes.

19.9.2.1.2.4.2 Y-Module Tab

The **Y module** tab lists the thermostats connected to the microscope.

Call page **Home > Microscope > Incubation > Y-Module**

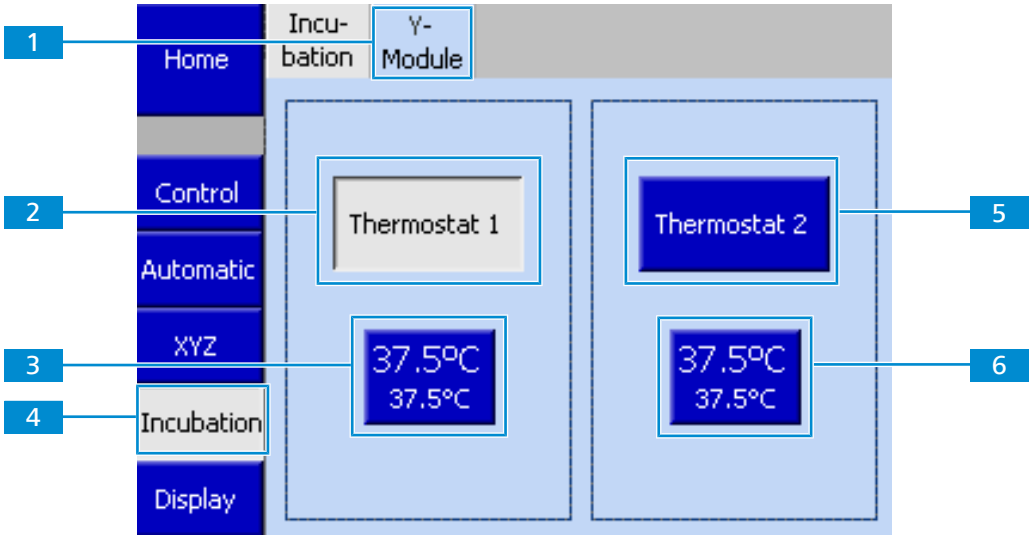


*Fig. 70: **Y-Module** tab*

1 **Y-Module** tab

2 **Thermostat 1** button, switches the component on/off.

3	Temperature control button of thermostat 1, opens the pop-up window to control the component. The button displays the set point (bottom) and the actual value (top) for the temperature of the controlled component.
4	**Incubation** button
5	**Thermostat 2** button, switches the component on/off.
6	Temperature control button of thermostat 2, opens the pop-up window to control the component. The button displays the set point (bottom) and the actual value (top) for the temperature of the controlled component.

19.9.2.1.3 Settings Page

Purpose The Settings page is used to configure the microscope settings.

Call page **Home > Settings**

The following pages can be accessed via the **Settings** page:

- **Components** *page [▸ 157]*
- **User** *page [▸ 163]*
- **Extras** *page [▸ 167]*
- **Info** *page [▸ 170]*

19.9.2.1.3.1 Components Page

Call page **Home > Settings > Components**

The following tabs can be accessed via the **Components** page:

- **Objectives** *tab [▸ 158]*
- **Reflector** *tab [▸ 159]*
- **Focus** *tab [▸ 160]*
- **Stage** *tab [▸ 161]*
- **Camera-ports** *tab [▸ 161]*
- **Misc** *tab [▸ 162]*

19.9.2.1.3.1.1 Objectives Tab

Call page **Home > Settings > Components > Objectives**

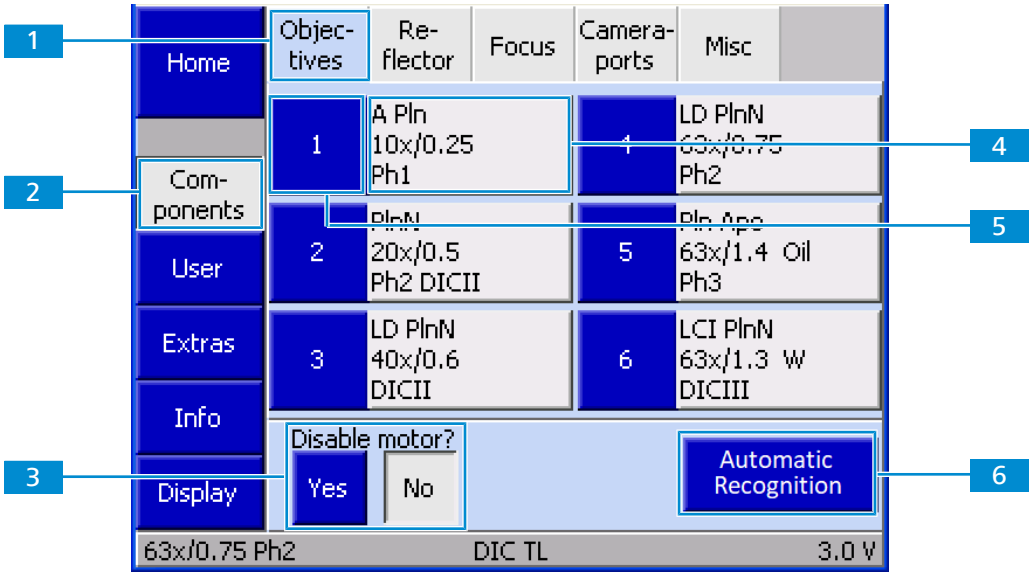


*Fig. 71: **Objectives** tab*

1 **Objectives** tab	**2** **Components** button
3 **Disable motor? Yes/No** buttons, deactivate/activate the motor if an objective heater or a piezo focus is fitted under the objective.	**4** Objective buttons (1-6), open the **Configure Objective #** pop-up window for configuring the appropriate nosepiece position.
5 Display field, shows the objective data (if the nosepiece position is configured).	**6** **Automatic Recognition** button, initiates the automatic component recognition of the objective, if an ACR nosepiece is installed.

Before any nosepiece position has been configured, the display fields of the buttons are labeled only with the numbers of the nosepiece positions. After configuring a nosepiece position, the following data is displayed:

- objective name
- magnification
- numerical aperture (NA)
- immersion

Once a new objective has been assigned, the corresponding objective button on the **Microscope > Control > Objective** *tab [▶ 144]* will be labeled with the magnification and the immersion type.

See chapter *Configuring the Nosepiece without ACR Function [▶ 117]* for more information.

19.9.2.1.3.1.2 Reflector Tab

Call page **Home > Settings > Components > Reflector**

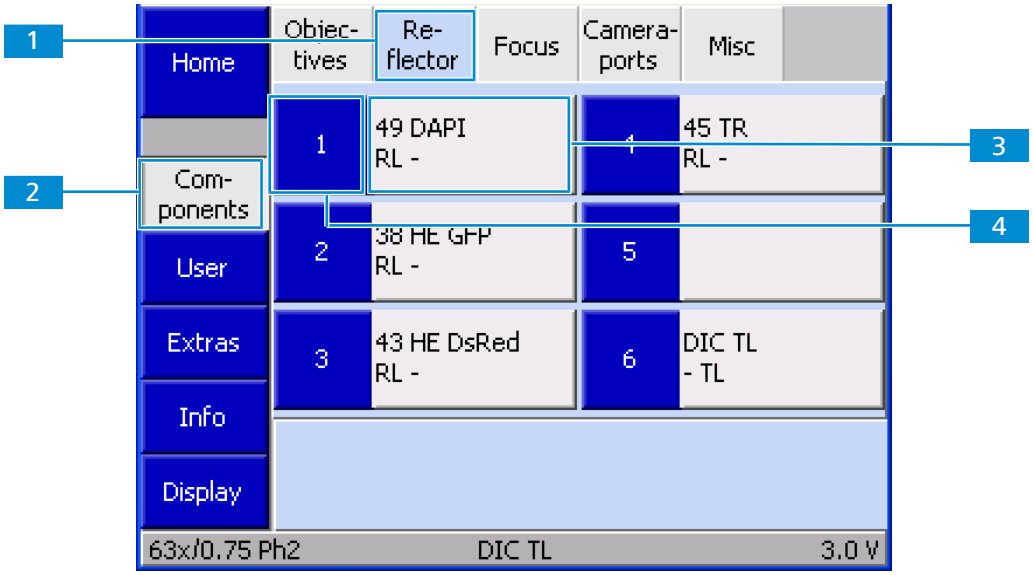


*Fig. 72: **Reflector** tab*

1 **Reflector** tab	**2** **Components** button
3 Reflector buttons (1-6), open the **Configure reflector position # in Reflector turret** pop-up window for configuring the appropriate reflector turret position.	**4** Display field, shows the reflector module data (if the reflector turret position is configured).

Before any reflectors have been configured, the buttons are labeled only with the numbers of the turret positions.

After configuring a reflector turret position the following data is displayed:

- designation (type)
- reflected light module (RL)
- transmitted light module (TL)

Once a reflector has been assigned to a position, the corresponding reflector button on the **Microscope > Control > Reflector** *tab [▸ 145]* will be labeled accordingly.

See chapter *Configuring the Reflector Turret Positions [▸ 179]* for more information.

19.9.2.1.3.1.3 Focus Tab

On **Focus** tab, the firmware settings for the focus drive can be entered. The speed of the focus drive can be set individually for each objective.

Call page **Home > Settings > Components > Focus**

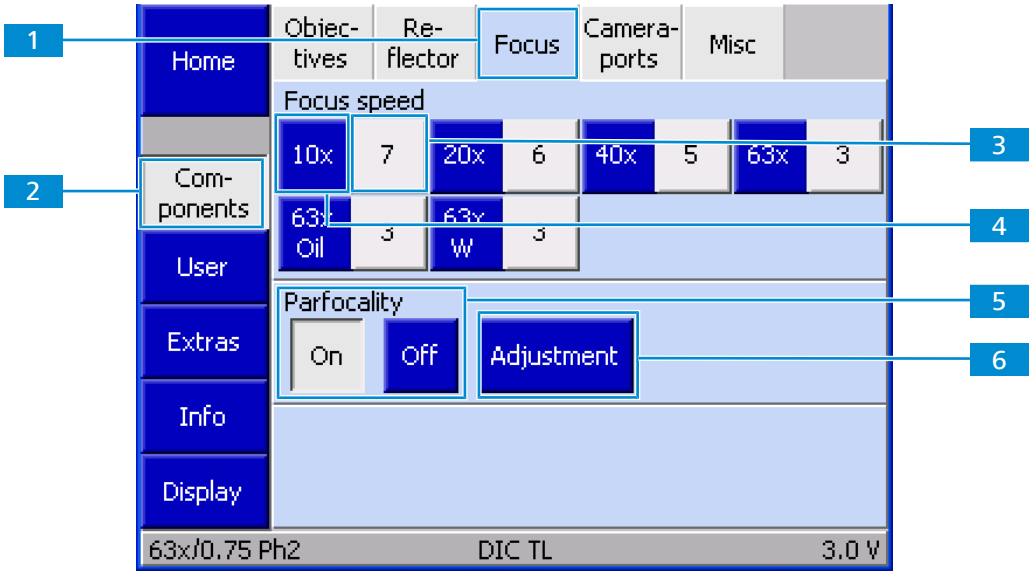


*Fig. 73: **Focus** tab*

1 **Focus** tab	**2** **Components** button
3 Focus speed buttons (1-6), open the **Focus speed for objective #** pop-up window for setting focus speed of the appropriate nosepiece position and shows the set focus speed (if this nosepiece position is configured).	**4** Display field, shows the objective magnification (if the nosepiece position is configured) or the number of the nosepiece position (if the nosepiece position is not configured).
5 **Parfocality On/Off** buttons, activate/deactivate the parfocality function.	**6** **Adjustment** button, activates the wizard for configuring the parfocality.

The following factors are recommended for the focus control speed, depending on the objective magnification:

Objective magnification	Factors for focus control speed
1x	10
1.25x	8
2.5x	8
5x	7
10x	7
20x	6
40x	5
50x	4
63x	3
100x	3

See chapter *Setting the Focus Speed [▶ 177]* for more information.

19.9.2.1.3.1.4 Stage Tab

The **Stage** tab will be displayed if a scanning stage mot. P; CAN is used.

Here, the XY stage movement can be adapted to the objective magnification.

Call page **Home > Settings > Components > Stage**

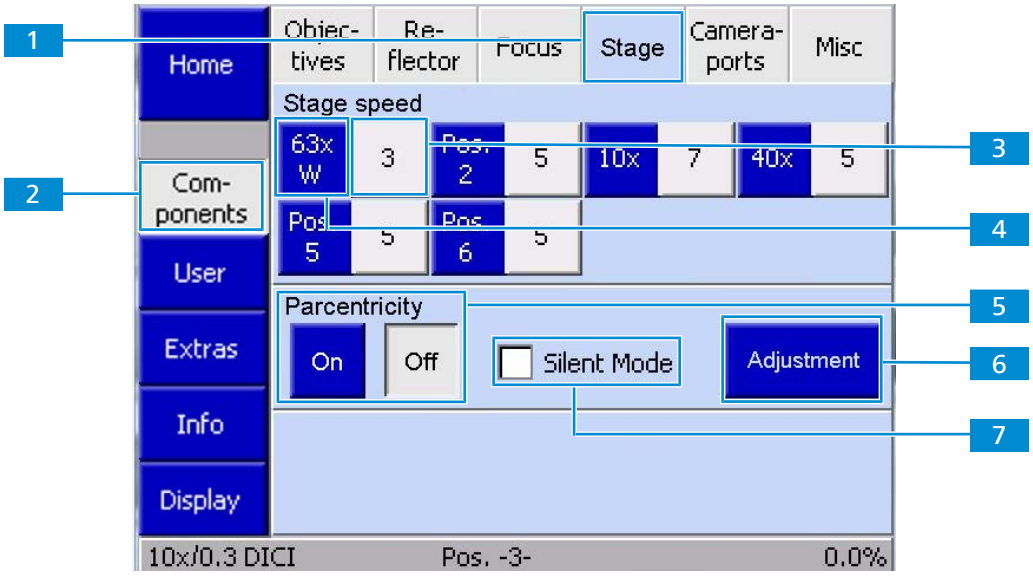


*Fig. 74: **Stage** tab*

1	**Stage** tab
2	**Components** button
3	Stage speed buttons (1-6), open the **Stage speed for objective #** pop-up window for setting the stage speed of the appropriate nosepiece position and shows the set stage speed (if this nosepiece position is configured).
4	Display field, shows the objective magnification (if the nosepiece position is configured) or the number of the nosepiece position (if the nosepiece position is not configured).
5	**Parcentricity On/Off** buttons, activate/deactivate the parcentricity function.
6	**Adjustment** button, activates the wizard for configuring the parcentricity.
7	**Silent Mode** check box, activates the silent mode if checked.

This settings influence the functions provided by the **Load position** button on the **Home** page.

19.9.2.1.3.1.5 Camera-ports Tab

The **Camera-ports** tab is used to configure the adapter for the camera ports (frontport, baseport, sideport, photo tube).

Up to five adapter buttons are displayed depending on the camera mirroring on the left and the tube used. The system detects the status of the ports during initialization (and when the **Settings > Components > Camera-ports** tab is opened).

Call page **Home > Settings > Components > Camera-ports**

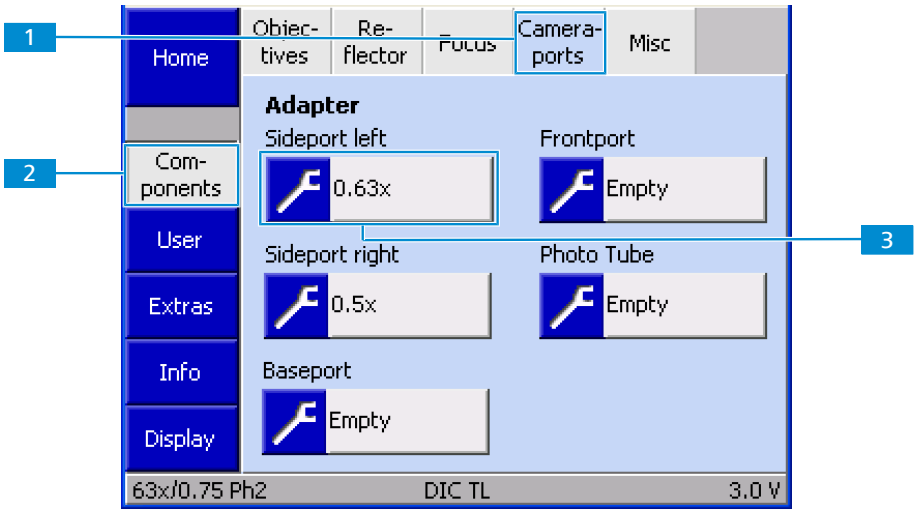


*Fig. 75: **Camera-ports** tab*

1 **Camera-ports** tab	**2** **Components** button
3 **Adapter** buttons (up to 5), open the **Select Camera Adapter** list to assign an adapter to the appropriate port or photo tube, the magnification of the adapter is shown on the button (if an adapter is assigned).	

See chapter *Configuring the Cameraports [▸ 179]* for more information.

19.9.2.1.3.1.6 Misc Tab

The **Misc** tab is used to configure additional, optional microscope components.

The number of buttons displayed depends on the components detected during initialization or when the **Settings > Components > Misc** tab is opened.

Call page **Home > Settings > Components > Misc**

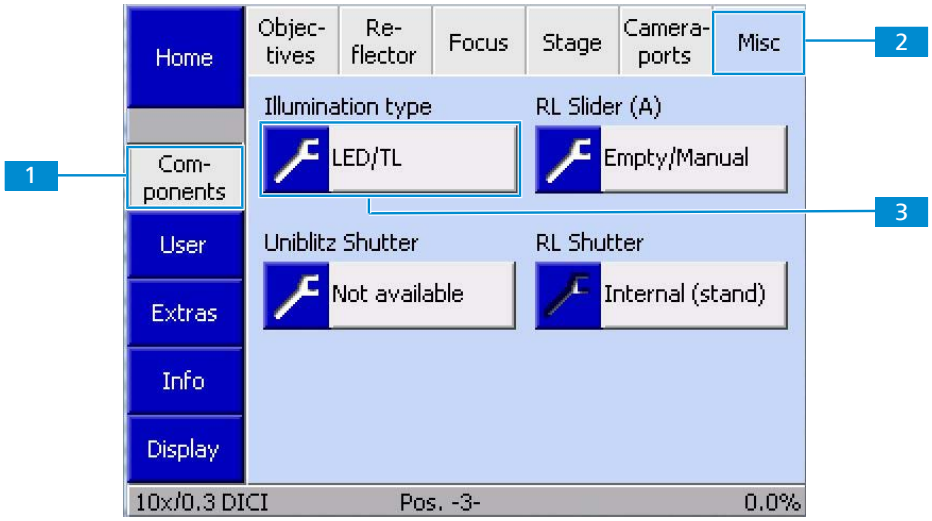


*Fig. 76: **Misc** tab*

1 **Components** button	**2** **Misc** tab
3 Component buttons, open the list to configure a component, the component is shown on the button (if configured).	

See chapter *Setting the Uniblitz Shutter [▸ 182]* for more information.

19.9.2.1.3.2 User Page

Call page **Home > Settings > User**

The following tabs can be accessed via the **User** page:

- **Mode** *tab [▸ 163]*
- **Buttons left** *tab [▸ 164]*
- **Buttons right** *tab [▸ 164]*
- **Stand type** *tab [▸ 165]*
- **Language** *tab [▸ 166]*
- **Docking Station** *tab [▸ 166]*

19.9.2.1.3.2.1 Mode Tab

The **Mode** tab is used to select between **Standard** and **Personal settings** modes.

Call page **Home > Settings > User > Mode**

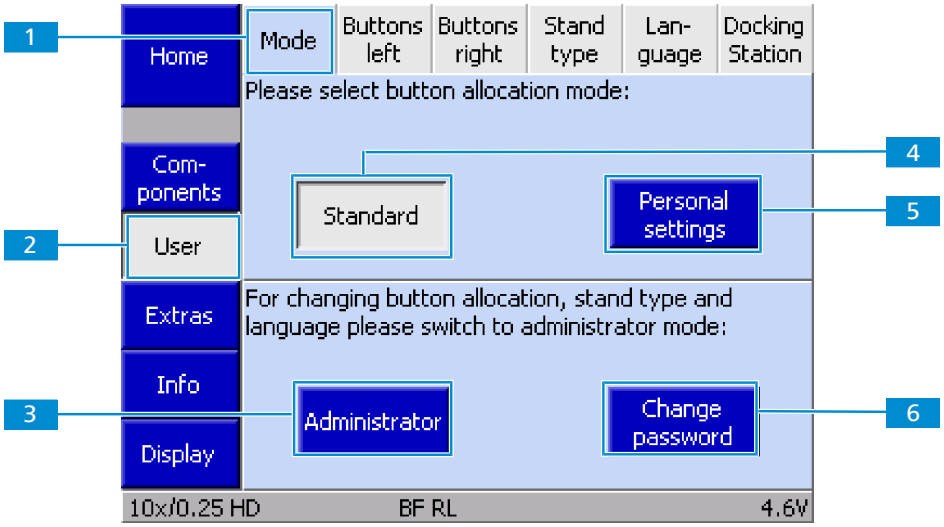


*Fig. 77: **Mode** tab*

1 **Mode** tab

2 **User** button

3 **Standard** button, activates the **Standard** mode.

All default functions (factory set) are active.

4 **Personal settings** button, activates **Personal settings** mode.

In **Personal settings** mode, administrator defined settings are active for the following controls:

- five buttons on the Z focus drive, right
- five buttons on the Z focus drive, left

5 **Administrator** button, opens the pop-up window to enter the administrator password for administrator mode.

The administrator password must be entered before the button allocation, stand type and language can be changed.

The factory-set password is "12345".

6 **Change password** button, opens the pop-up window to change the administrator password.

See chapters *Setting the Button Allocation Mode [▸ 174]* and *Activating the Administrator Mode [▸ 174]* for more information.

19.9.2.1.3.2.2 Buttons Left Tab

The **Buttons left** tab is used to configure the buttons on the left control ring.

An administrator password must be entered before the button configuration can be changed. Users who do not have administrator privileges will be able to view the button configuration, but will not be able to edit it.

Call page **Home > Settings > User > Buttons left**

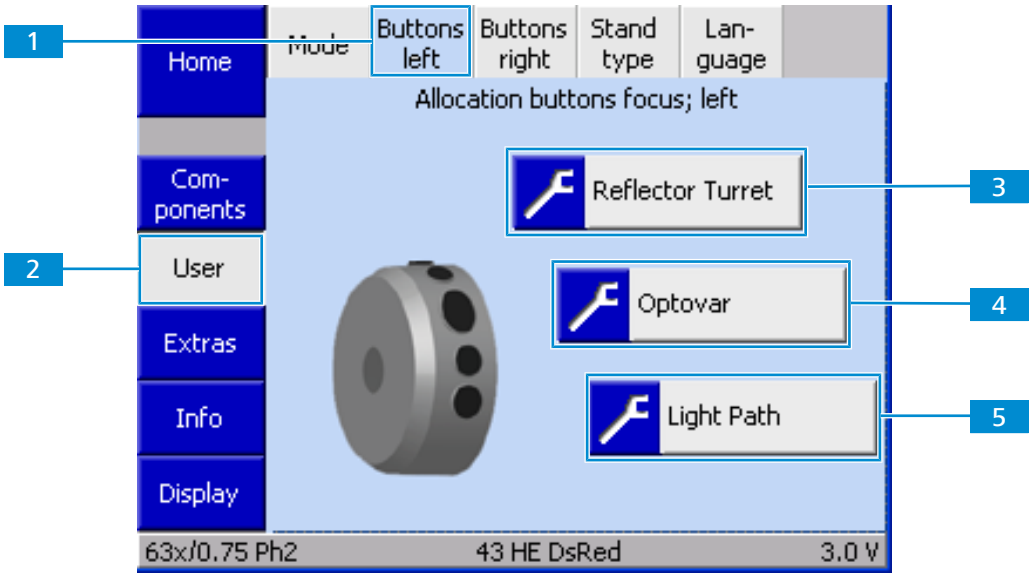


*Fig. 78: **Buttons left** tab*

1	**Buttons left** tab
2	**User** button
3	Allocation button for the upper pair of buttons, opens the drop/down list to select the desired function.
4	Allocation button for the single button on the middle, opens the drop/down list to select the desired function.
5	Allocation button for the lower pair of buttons, opens the drop/down list to select the desired function.

See chapter *Configuring the Buttons of the Left Control Ring [▸ 175]* for more information.

19.9.2.1.3.2.3 Buttons Right Tab

The **Buttons right** tab is used to configure the buttons on the right control ring.

An administrator password must be entered before the button configuration can be changed. Users who do not have administrator privileges will be able to view the button configuration, but will not be able to edit it.

Call page **Home > Settings > User > Buttons right**

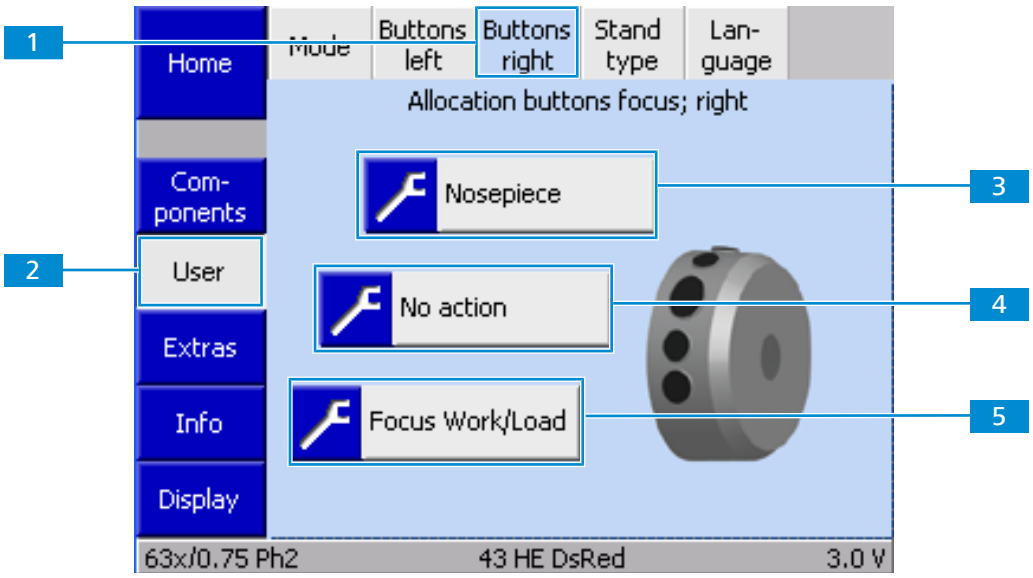


*Fig. 79: **Buttons right** tab*

1	**Buttons right** tab
2	**User** button
3	Allocation button for the upper pair of buttons, opens the drop/down list to select the desired function.
4	Allocation button for the single button on the middle, opens the drop/down list to select the desired function.
5	Allocation button for the lower pair of buttons, opens the drop/down list to select the desired function.

See chapter *Configuring the Buttons of the Right Control Ring [▸ 175]* for more information.

19.9.2.1.3.2.4 Stand Type

Call page **Home > Settings > User > Stand type**

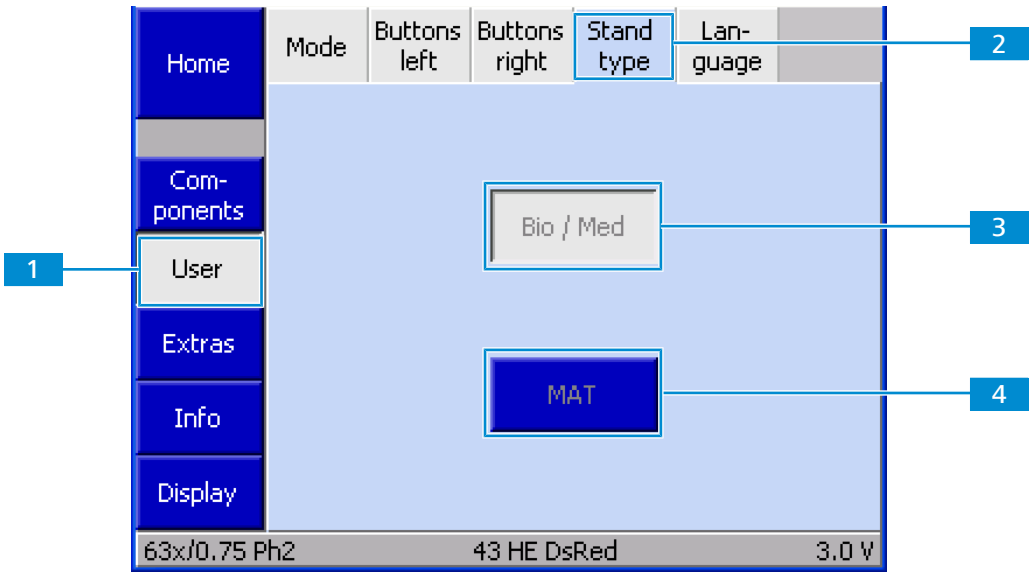


*Fig. 80: **Stand type** tab*

1	**User** button
2	**Stand type** tab
3	**Bio / Med** button, sets the stand type to a Bio / Med microscope.
4	**MAT** button, sets the stand type to a MAT (materials) microscope.

See chapter *Selecting the Stand Type [▸ 176]* for more information.

19.9.2.1.3.2.5 Language Tab

Call page **Home > Settings > User > Language**

*Fig. 81: **Language** tab*

1	**User** button	2	**Language** tab
3	Language list, for selecting the desired language.	4	**Set language** button, confirms the selection.

See chapter *Selecting the Language [▶ 176]* for more information.

19.9.2.1.3.2.6 Docking Station Tab

The **Docking Station** tab is used to configure the buttons on the control ring of the docking station.

An administrator password must be entered before the button configuration can be changed. Users who do not have administrator privileges will be able to view the button configuration, but will not be able to edit it.

Call page **Home > Settings > User > Docking Station**

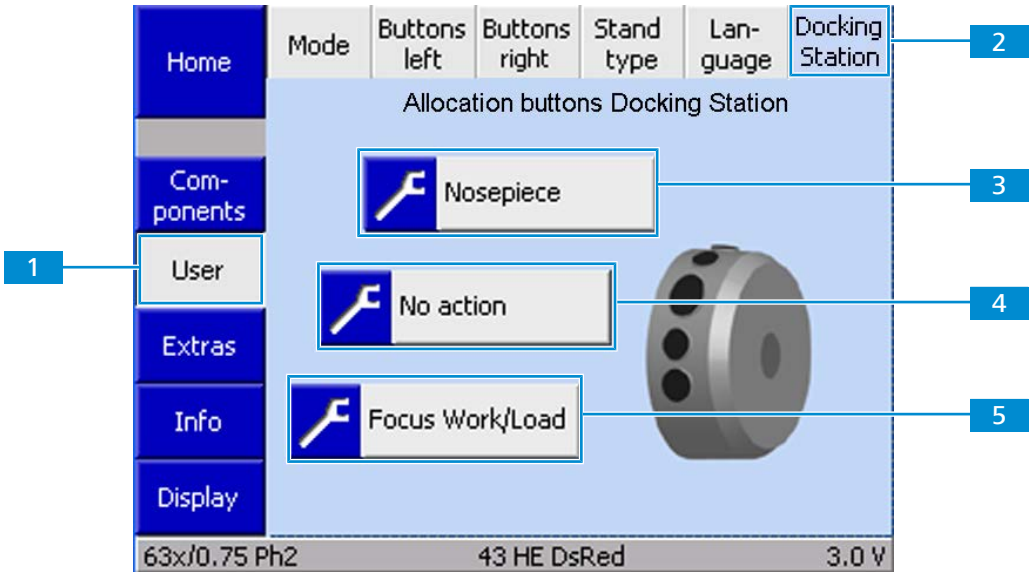


*Fig. 82: **Docking Station** tab*

1	**User** button	2	**Docking Station** tab

3 Allocation button for the upper pair of buttons, opens the drop/down list to select the desired function.

4 Allocation button for the single button on the middle, opens the drop/down list to select the desired function.

5 Allocation button for the lower pair of buttons, opens the drop/down list to select the desired function.

See chapter *Configuring the Buttons of the Docking Station [▶ 177]* for more information.

19.9.2.1.3.3 Extras Page

Call page **Home > Settings > Extras**

The following tabs can be accessed via the **Extras** page:

- **Light Manager** *tab [▶ 167]*
- **Oil stop** *tab [▶ 168]*
- **Dazzle protect** *tab [▶ 168]*
- **Ethernet** *tab [▶ 169]*
- **Misc** *tab [▶ 170]*

19.9.2.1.3.3.1 Light Manager Tab

Call page **Home > Settings > Extras > Light manager**

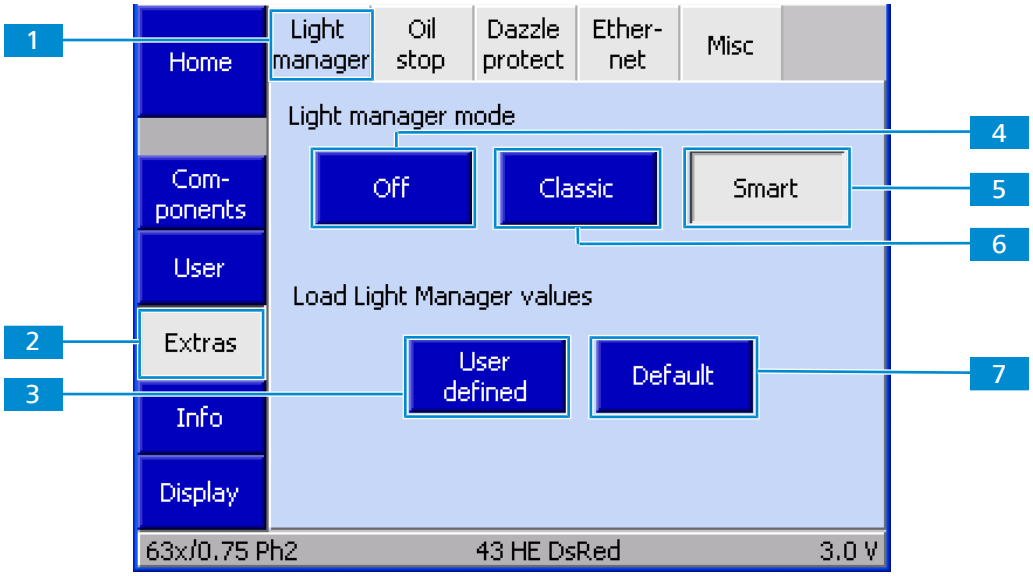


*Fig. 83: **Light manager** tab*

1 **Light manager** tab

2 **Extras** button

3 **User defined** button, resets to the last settings made using the **LM-Set** button.

4 **Off** button, activates Light Manager Off mode.

5 **Smart** button, activates Light Manager Smart mode.

6 **Classic** button, activates Light Manager Classic mode.

7 **Default** button, loads the default values, written to the temporary memory and set as active.

19.9.2.1.3.3.2 Oil Stop Tab

Purpose The oil stop function prevents a dry objective from being moved into the immersion fluid. The nosepiece is always lowered when switching between a dry and an immersion objective.

Call page **Home > Settings > Extras > Oil stop**

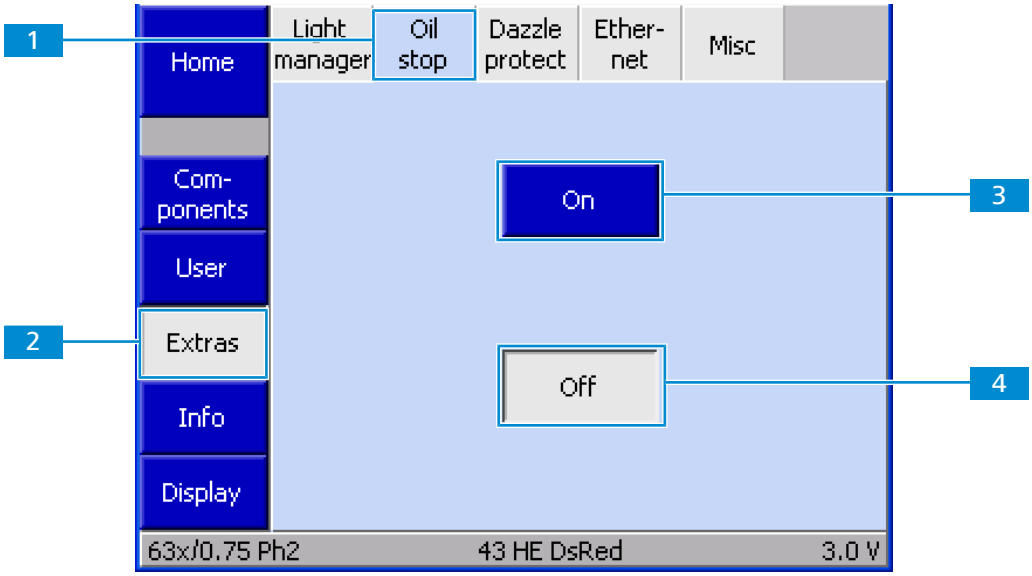


*Fig. 84: **Oil stop** tab*

1	**Oil stop** tab	2	**Extras** button
3	**On** button, activates the oil stop function.	4	**Off** button, deactivates the oil stop function.

See chapter *Activating/Deactivating the Oil Stop Function [▸ 178]* for more information.

19.9.2.1.3.3.3 Dazzle Protect Tab

Purpose The dazzle protect tab is used to activate or deactivate the Dazzle protect function.

If the dazzle protect function is deactivated globally, all other fields on this tab will be grayed out.

If one of the above components is not installed, the corresponding buttons will not be displayed.

Call page **Home > Settings > Extras > Dazzle protect**

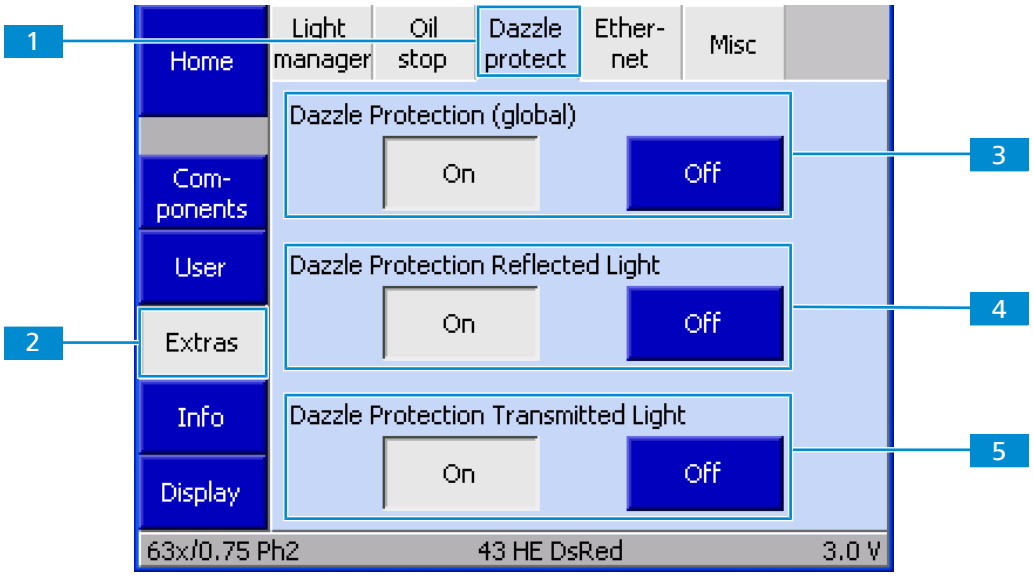


*Fig. 85: **Dazzle protect** tab*

1 **Dazzle protect** tab

2 **Extras** button

3 **Dazzle Protection (global) On/Off** buttons, activate/deactivate the global dazzle protection.

4 **Dazzle Protection Reflected Light On/Off** buttons, activate/deactivate the dazzle protection for reflected light.

5 **Dazzle Protection transmitted Light On/Off** buttons, activate/deactivatethe dazzle protection for transmitted light.

See chapter *Activating/Deactivating the Dazzle Protection Function [▸ 178]* for more information.

19.9.2.1.3.3.4 Ethernet Tab

Purpose This tab is used to configure the stand's Ethernet connection.

Call page **Home > Settings > Extras > Ethernet**

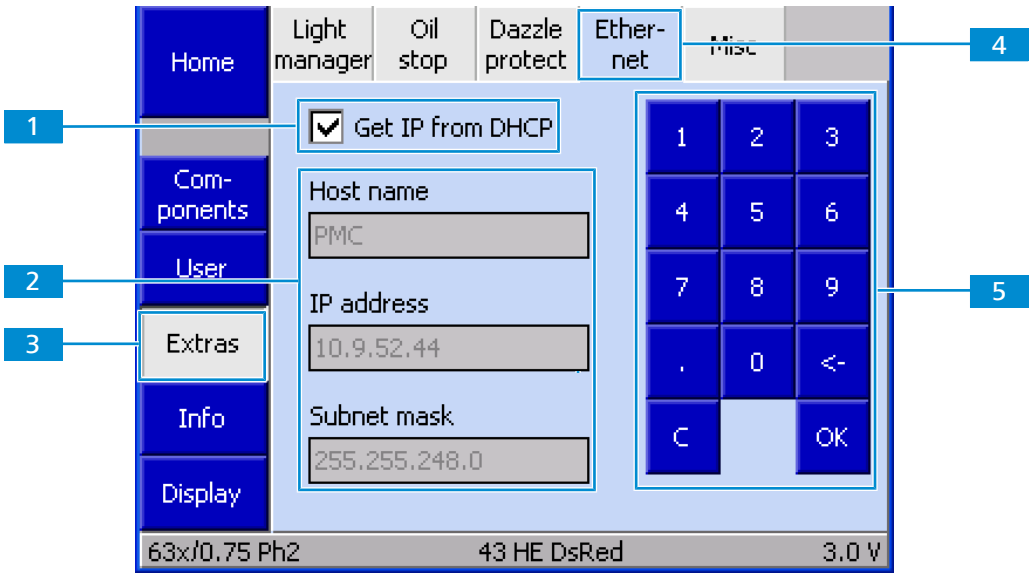


*Fig. 86: **Ethernet** tab*

1 **Get IP from DHCP** check box, for the automatic retrieval of the Ethernet connection data from DHCP.

2 **Hostname**, **IP adress** and **Subnet mask** input boxes, for manual input of the Ethernet connection data.

3 **Extras** button

4 **Ethernet** tab

5 Numeric keypad for entering the Ethernet connection data.

See chapter *Configuring the Ethernet Connection [▸ 178]* for more information.

19.9.2.1.3.5 Misc Tab

Purpose This tab is used to calibrate the TFT display.

Function Once the TFT calibration button has been pressed, crosses will appear in various positions. A blunt pencil should then be pressed exactly on the center of the crosses. This ensures that the matrix for touching image displays is aligned.

Call page **Home > Settings > Extras > Misc**

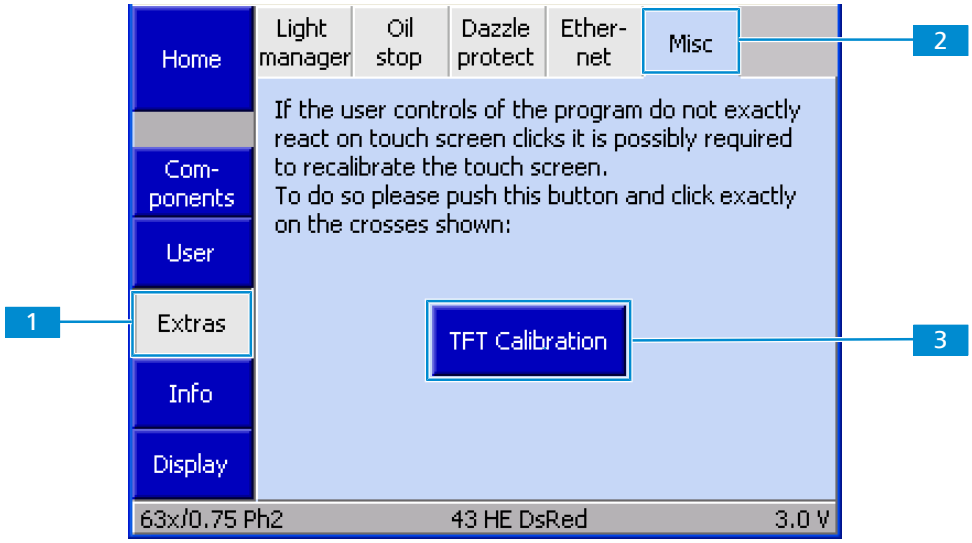


*Fig. 87: **Misc** tab*

1 **Extras** button

2 **Misc** tab

3 **TFT Calibration** button, starts the TFT calibration procedure.

See chapter *Calibrating the TFT Display [▸ 174]* for more information.

19.9.2.1.3.4 Info Page

Call page **Home > Settings > Info**

The following tabs can be accessed via the **Info** page:

- **Firmware** *tab [▸ 171]*

19.9.2.1.3.4.1 Firmware Tab

The **Firmware** tab shows the firmware version.

Call page **Home > Settings > Info > Firmware**

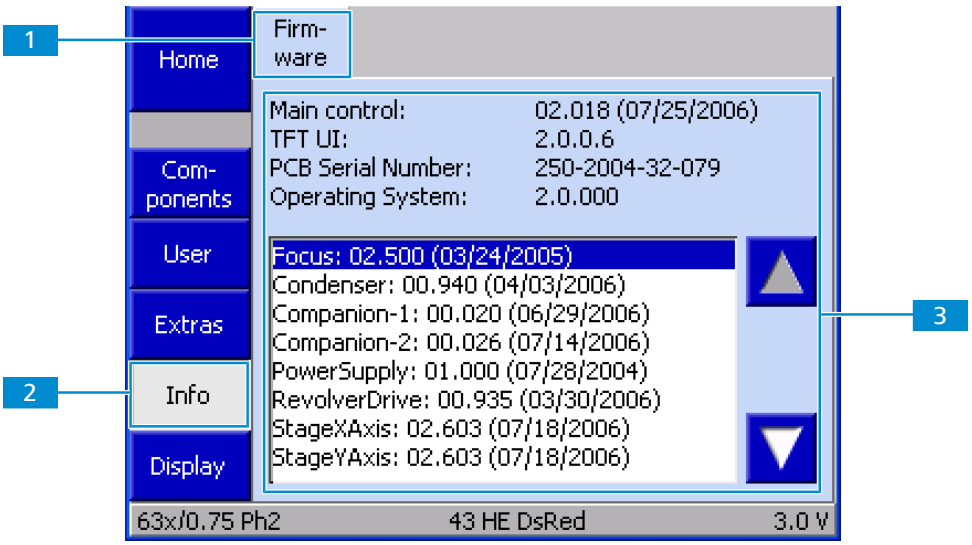


*Fig. 88: **Firmware** tab*

1	**Firmware** tab	2	**Extras** button
3	Firmware information and list of component versions.		

19.9.2.1.4 Display Page

Call page **Display**

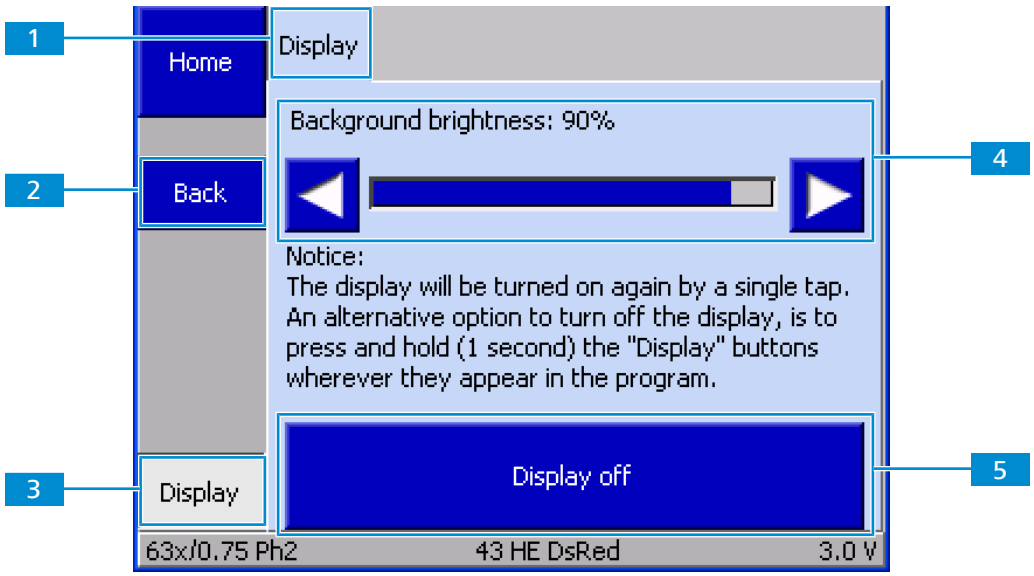


*Fig. 89: **Display** tab*

1	**Display** tab	2	**Back** button, switches the display to the previous page/tab.
3	**Display** button, opens the **Display** tab. Switches the TFT display off by pressing and holding the **Display** button for 1 second.	4	**Arrow** buttons, for setting the background brightness of the TFT display. The set brightness is displayed as a percentage and in the bar display.

5 **Display off** button, switches the TFT display off and switches the display to the previous page/tab.

The TFT display switches on again by a single tap on the screen.

See chapters *Setting the Brightness of the TFT Display [▸ 177]* and *Switching Off the TFT Display [▸ 183]* for more information.

19.9.2.2 Control Area

The controls area is subdivided into further subsections.

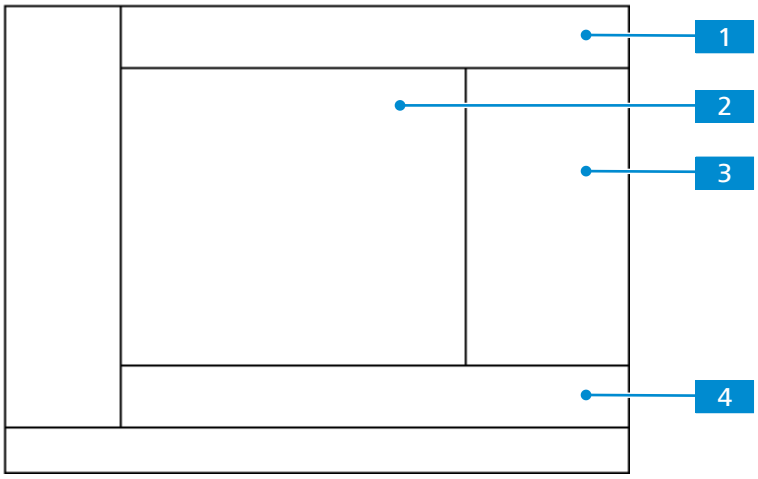


Fig. 90: Control area of the TFT display

No.	Name	Function
1	Tabs	Tabs are used to select subsidiary functions. These are displayed in the controls area. A maximum of six tabs are available per page.
2	Operation	This area contains controls relevant to the option selected on the navigation bar and the selected tab.
3	Illumination/shutter	The **RL shutter** button for reflected light and **TL shutter** button for transmitted light are displayed on the right side of the controls area. For transmitted light, the shutter is switched according to configuration. The **Off** and **On** buttons function as switches, i.e. the shutter in the optical path of the microscope is either open or closed.
4	Contrast manager	At the bottom of the controls area, there is a bar on which are displayed buttons for selecting the contrast technique. The contrast techniques available depend on the current microscope configuration. The following contrast techniques may be available: ▪ Fluorescence (FL) ▪ Brightfield (BF) ▪ Phase contrast (PH) ▪ Differential interference contrast (DIC)

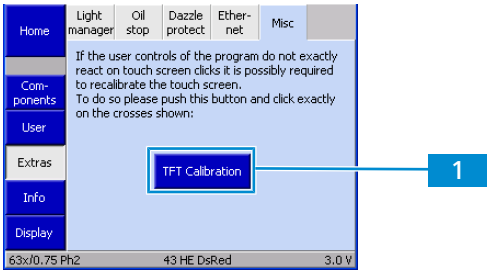
No.	Name	Function
		The contrast techniques arise from the interaction between the condenser, reflector turret, shutter positions and other parameters. The current contrast technique is displayed on the TFT display. No contrast technique is displayed for manual settings (e.g. empty reflector turret position with open RL shutter).
-	Pop-up windows	Pop-up windows are displayed in order to: ▪ prompt the operator for additional entries. The user must make a selection (e.g. adjust the configuration after initialization, enter values, etc.) ▪ display error messages or special information. Some messages require the user to acknowledge the message by pressing **Close** ▪ display the operating status (waiting time). These windows close automatically When a pop-up window is open, it is not possible to operate the page underneath.

19.9.3 Calibrating the TFT Display

If the user controls of the program do not exactly react on touch screen clicks it is possibly required to recalibrate the touch screen.

Procedure

1. Press **Home > Settings > Extras > Misc** on the TFT display.



   → The **Misc** tab appears on the screen.

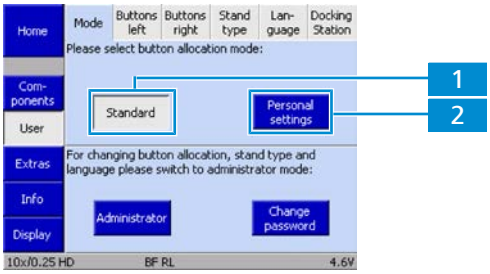
2. Press the **TFT Calibration** button 1 to start the calibration.
   → Crosses will appear in various positions on the screen.
3. Press exactly on the center of the crosses. Use a blunt pencil.

19.9.4 Configuring User Settings

19.9.4.1 Setting the Button Allocation Mode

Procedure

1. Press **Home > Settings > User > Mode** on the TFT display.



   → The **Mode** tab appears on the screen.

Standard Mode

Procedure

1. Press **Standard** 1 to activate the **Standard** mode.
   → In **Standard** mode, all default configurations for users are active (factory set).

Personal Settings Mode

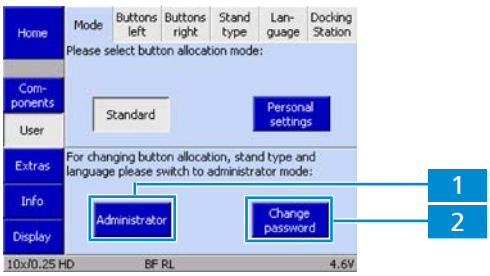
Procedure

1. Press **Personal settings** 2 to activate the **Personal settings** mode.
   → In **Personal settings** mode, the configurations for users defined by the administrator are active for the allocation of the five keys on the left and right focusing drive.

19.9.4.2 Activating the Administrator Mode

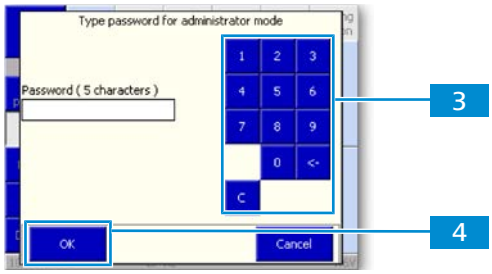
Procedure

1. Press **Home > Settings > User > Mode** on the TFT display.



   → The **Mode** tab appears on the screen.

2. Press **Administrator** 1 to switch to administrator mode.
3. Enter the password 3.



→ The factory-set password is "12345".

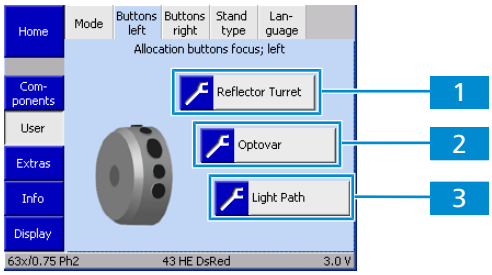
4. Press **OK** 4 to confirm or **Cancel** to abort.
5. If required, press **Change password** 2 to set a new one.

19.9.4.3 Configuring the Buttons of the Left Control Ring

Prerequisite ✓ The **Administrator** *mode [▶ 174]* is activated.

Procedure

1. Press **Home > Settings > User > Buttons left** on the TFT display.



→ The **Buttons left** tab appears on the screen.

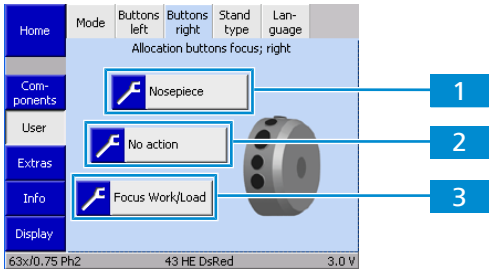
2. Press the gray button 1 to select the function for the upper pair of buttons.
   → A drop-down list opens.
   → Only functions which are actually available with the current microscope configuration are listed.
3. Select the desired function.
4. Press **Save** to assign the required function.
   → The button shows the selected function.
5. Press the gray button 2 to select the function for the single button in the middle.
6. Press **Save** to assign the required function.
7. Press the gray button 3 to select the function for the lower pair of buttons.

19.9.4.4 Configuring the Buttons of the Right Control Ring

Prerequisite ✓ The **Administrator** *mode [▶ 174]* is activated.

Procedure

1. Press **Home > Settings > User > Buttons right** on the TFT display.



→ The **Buttons right** tab appears on the screen.

2. Press the gray button 1 to select the function for the upper pair of buttons.
   → A drop-down list opens.

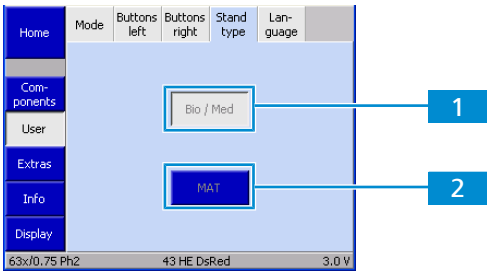
→ Only functions which are actually available with the current microscope configuration are listed.

3. Select the desired function.
4. Press **Save** to assign the required function.
   → The button shows the selected function.
5. Press the gray button 2 to select the function for the single button in the middle.
6. Press **Save** to assign the required function.
7. Press the gray button 3 to select the function for the lower pair of buttons.

19.9.4.5 Selecting the Stand Type

Procedure

1. Press **Home > Settings > User > Stand type** on the TFT display.



   → The **Stand type** tab appears on the screen.
2. Press the **Bio / Med** 1 or **MAT** (materials) button 2 to configure the stand type of the microscope.

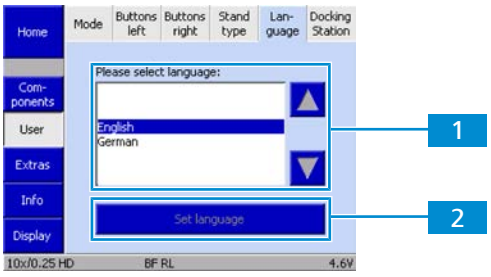
Info

Changes to this setting will take effect once the microscope has restarted automatically.

19.9.4.6 Selecting the Language

Procedure

1. Press **Home > Settings > User > Language** on the TFT display.



   → The **Language** tab appears on the screen.
2. Select the desired language from the list 1.
3. Press the **Set language** button 2 to confirm.

Info

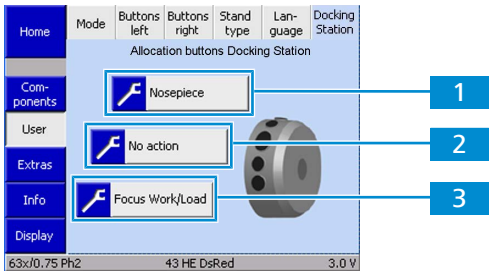
Changes to this setting will take effect once the microscope has restarted automatically.

19.9.4.7 Configuring the Buttons of the Docking Station

Prerequisite ✓ The **Administrator** *mode [▸ 174]* is activated.

Procedure

1. Press **Home > Settings > User > Docking Station** on the TFT display.

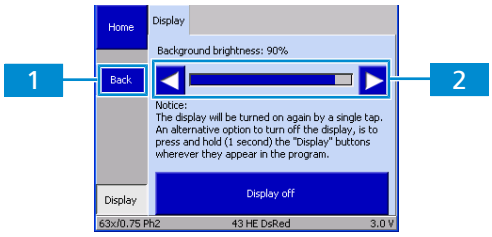


   → The **Docking Station** tab appears on the screen.
2. Press the gray button 1 to select the function for the upper pair of buttons.
   → A drop-down list opens.
   → Only functions which are actually available with the current microscope configuration are listed.
3. Select the desired function.
4. Press **Save** to assign the required function.
   → The button shows the selected function.
5. Press the gray button 2 to select the function for the single button in the middle.
6. Press **Save** to assign the required function.
7. Press the gray button 3 to select the function for the lower pair of buttons.

19.9.5 Setting the Brightness of the TFT Display

Procedure

1. Press the **Display** button on the TFT display.



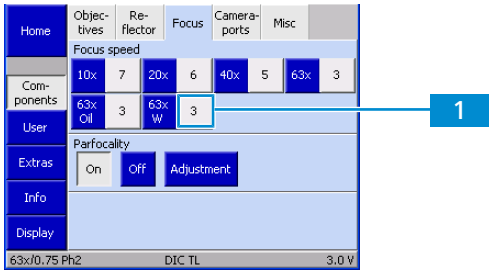
   → The **Display** tab appears on the screen.
2. Set the desired background brightness of the TFT display. Use the **Arrow** buttons 2.
3. Press the **Back** button 1 to switch to the previous page/tab.

19.9.6 Configuring of Axio Observer 7, 7 Materials Stand

19.9.6.1 Setting the Focus Speed

Procedure

1. Press **Home > Settings > Components > Focus** on the TFT display.



   → The **Focus** tab appears on the screen.
2. Press the relevant button 1 to configure the focus speed for the objective of this nosepiece position.

→ The **Focus speed for objective #** pop-up window appears.

3. Set the focus speed between values of 1 and 10. Use the **Arrow** buttons.

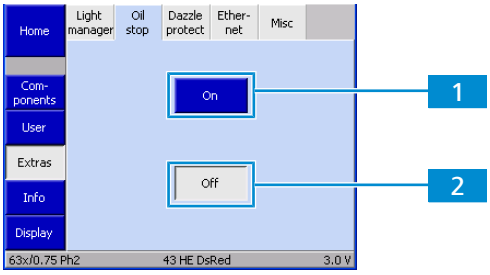
→ The higher the numerical value, the higher the focus speed in the selected magnification.

4. Press **Save** to confirm and to close the pop-up window.

19.9.6.2 Activating/Deactivating the Oil Stop Function

Procedure

1. Press **Home > Settings > Extras > Oil stop** on the TFT display.



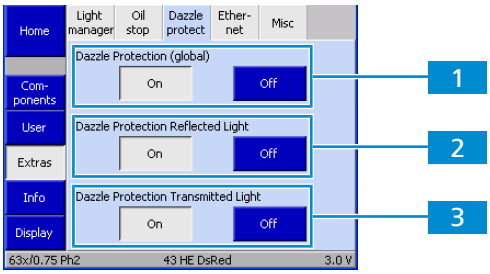
→ The **Oil stop** tab appears on the screen.

2. Press the **On** button 1 to activate the oil stop function.
3. Press the **Off** button 2 to deactivate the oil stop function.

19.9.6.3 Activating/Deactivating the Dazzle Protection Function

Procedure

1. Press **Home > Settings > Extras > Dazzle protect** on the TFT display.



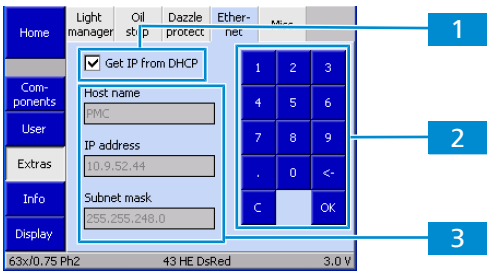
→ The **Dazzle protect** tab appears on the screen.

2. Press the **On** or **Off** button 1 to activate/deactivate the global dazzle protection function.
3. Press the **On** or **Off** button 2 to activate/deactivate the dazzle protection function for reflected light.
4. Press the **On** or **Off** button 3 to activate/deactivate the dazzle protection function for transmitted light.

19.9.6.4 Configuring the Ethernet Connection

Procedure

1. Press **Home > Settings > Extras > Ethernet** on the TFT display.



→ The **Ethernet** tab appears on the screen.

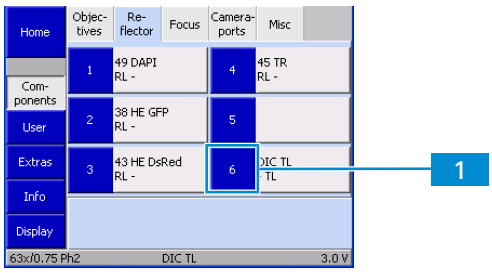
2. Activate the **Get IP from DHCP** check box 1 for the automatic retrieval of the Ethernet connection data from DHCP.

3. For manual input of the Ethernet connection data, deactivate **Get IP from DHCP** check box.
4. Enter the Ethernet connection data in the **Hostname**, **IP adress** and **Subnet mask** input boxes 3. Use the numeric keypad 2.

19.9.6.5 Configuring the Reflector Turret Positions

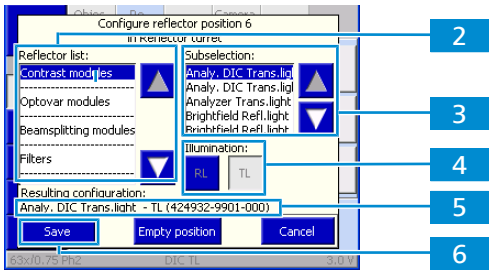
Procedure

1. Press **Home > Settings > Components > Reflector** on the TFT display.



→ The **Reflector** tab appears on the screen.

2. Press the relevant button to configure the reflector turret position, e.g. the **6** button 1.

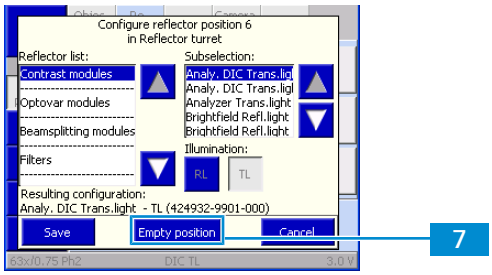


→ The **Configure reflector position 6 in Reflector turret** pop-up window appears.

3. Preselect the reflector type in the **Reflector list:** field 2.
4. Select the reflector name in the **Subselection:** list 3.
5. Select **RL** or **RL** in the **Illumination:** field 4.

→ The selection is shown in **Result configuration:** field 5.

6. Press **Empty position** 7 to set the position to empty or to clear the current selection. If required, select the relevant reflector turret position and confirm by pressing **Yes**.



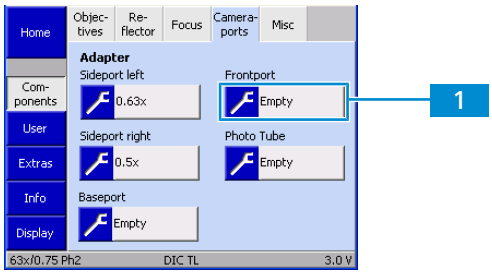
7. Press **Save** 6 and confirm the settings.
8. Press **Cancel** to close the pop-up window without saving the reflector selection.

19.9.6.6 Configuring the Cameraports

Prerequisite ✓ Stand type Axio Observer 7 or Axio Observer 7 materials available.

Procedure

1. Press **Home > Settings > Components > Camera-ports** on the TFT display.



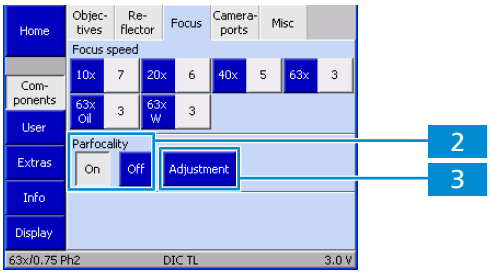
→ The **Camera-ports** tab appears on the screen.

2. Press the relevant button 1 (e.g. **Frontport**) to assign adapters camera ports.
   → The **Select Camera Adapter** list appears.
3. Select the appropriate adapter from the list. Use the Arrow buttons.
4. Press **Save** 3 to confirm and to close the list.
   → The magnification of the adapter is shown on the button.

19.9.6.7 Setting the Parfocality

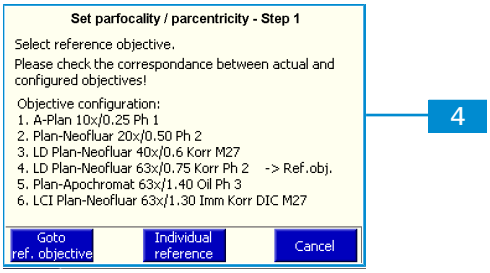
Procedure

1. Press **Home > Settings > Components > Focus** on the TFT display.



→ The **Focus** tab appears on the screen.

2. Press **On** in the **Parfocality** field 2 to activate the parfocality function.
3. Press **Adjustment** 3 ton configure the parfocality function.



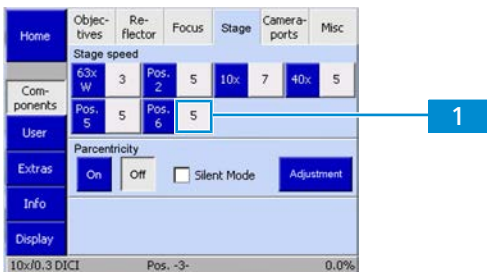
→ This will activate a wizard which will guide you through the configuration procedure. The **The set parfocality / parcentricity - Step 1** pop-up window 4 appears.

4. Follow the instructions of the wizard.
   → All the objectives must be focused in sequence.
5. Start with all dry objectives from the highest to the lowest magnification.
6. Then, proceed with all immersion objectives from the highest to the lowest magnification.
7. Press **Next Objective** to rotate the nosepiece to the next objective.
8. After all objectives have been focused, press **End**.

19.9.6.8 Setting the Stage Speed

Procedure

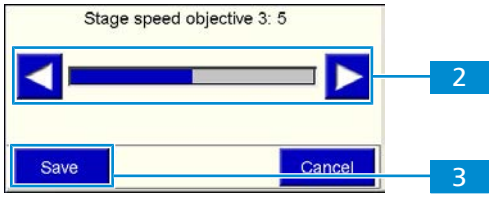
1. Press **Home > Settings > Components > Stage** on the TFT display.



→ The **Stage** tab appears on the screen.

2. Press the relevant button 1 to configure the stage speed for the objective of this nosepiece position.
   → The **Stage speed objective #: ...** pop-up window appears.

3. Set the stage speed. Use the **Arrow** buttons 2.

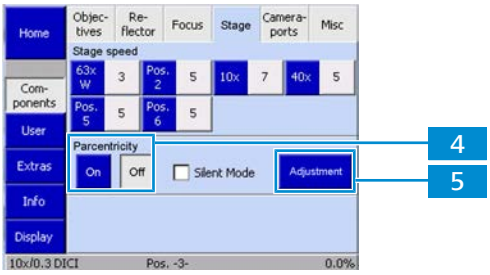


4. Press the **Save** button 3

19.9.6.9 Setting the Parcentricity

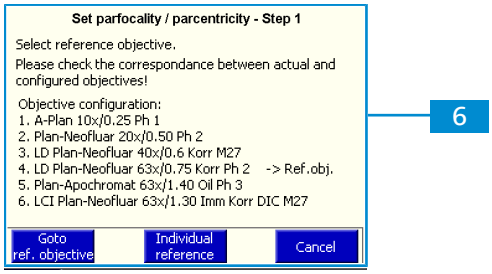
Procedure

1. Press **Home > Settings > Components > Stage** on the TFT display.



→ The **Stage** tab appears on the screen.

2. Press **On** in the **Parcentricity** field 4.
3. Press **Adjustment** 5.



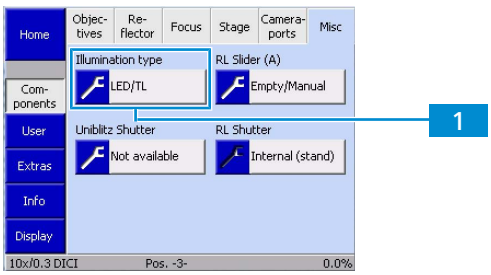
→ This will activate a wizard which will guide you through the configuration procedure. The **The set parfocality / parcentricity - Step 1** pop-up window 6 appears.

4. Follow the instructions of the wizard.
   → All the objectives must be focused in sequence.
5. Start with all dry objectives from the highest to the lowest magnification.
6. Then, proceed with all immersion objectives from the highest to the lowest magnification.
7. Press the **Next Objective** button to rotate the nosepiece to the next objective.
8. After all objectives have been focused, press **End**.

19.9.6.10 Setting the Illumination Type

Procedure

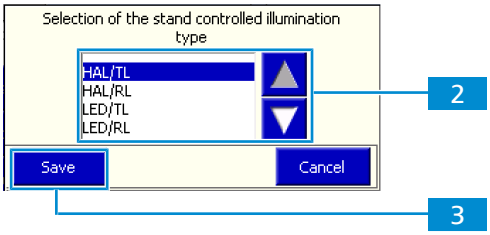
1. Press **Home > Settings > Components > Misc** on the TFT display.



→ The **Misc** tab appears on the screen.

2. Press**Illumination Type** 1.
   → The **Selection of the stand controlled illumination type** pop-up window appears.

3. Select the illuminator from the list 2. Use the Arrow buttons.

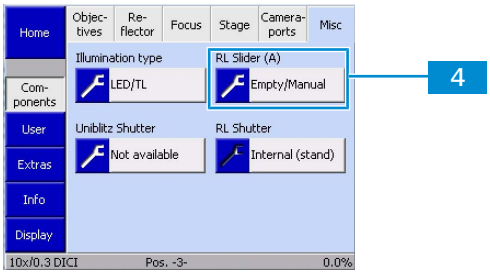


4. Press **Save** 3 to confirm and to close the window.
   → The selected illuminator is shown on the button.

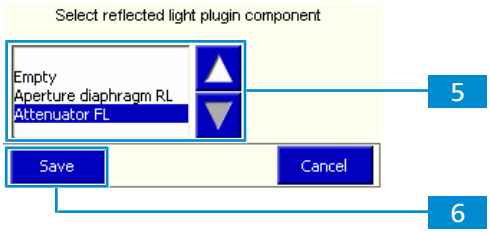
19.9.6.11 Setting the RL Slider (A)

Procedure

1. Press **Home > Settings > Components > Misc** on the TFT display.



   → The **Misc** tab appears on the screen.
2. Press **RL Slider (A)** 4.
   → The **Select reflected light plugin component** pop-up window appears.
3. Select the RL plugin component from the list 5. Use the Arrow buttons.

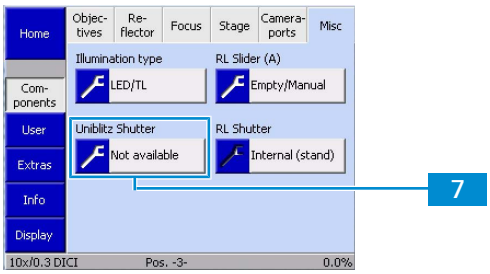


4. Press **Save** 6 to confirm and to close the window.
   → The selected component is shown on the button.

19.9.6.12 Setting the Uniblitz Shutter

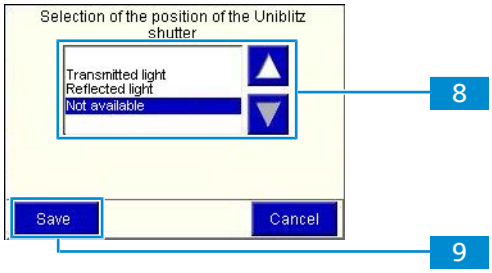
Procedure

1. Press **Home > Settings > Components > Misc** on the TFT display.



   → The **Misc** tab appears on the screen.
2. Press **Uniblitz Shutter** 7.
   → The **Selection of the position of the Uniblitz shutter** pop-up window appears.

3. Select the position of the Uniblitz shutter from the list 8 or **Not available**. Use the Arrow buttons.



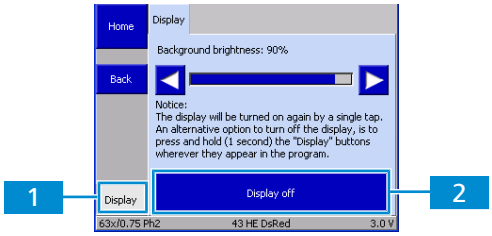
   → The Uniblitz shutter is fitted in the transmitted or reflected light beam path or it is not available.

4. Press **Save** 9 to confirm and to close the window.
5. Press the **Cancel** button to close the window without any selection.

19.9.7 Switching Off the TFT Display

Procedure

1. Press the **Display** button on the TFT display.



   → The **Display** tab appears on the screen.

2. Press the **Display off** button 2 to switch the display off.
   → After the TFT display is switched off, it returns from the **Display** page to the page from which it was activated. This page will be displayed when the display is switched back on.
3. Alternatively, press and hold the **Display** button 1 for 1 second to switch the display off.
4. Tap the TFT display once briefly to switch it back on.

Revision History

Revision	Date of Issue	Introduced Modifications
2	10/2025	▪ Editorial rework ▪ Reorganization of ZEISS contact information ▪ Implementation of TÜV SÜD marking ▪ Correction of chapter(s): – *Explanation of Symbols [▸ 10]* – *Declaration of China RoHS [▸ 106]*
1	05/2024	▪ New material number as successor of 431004-7244-001, revision 8. ▪ Editorial rework ▪ Adaptation to Directive 2014/35/EU (LVD)

Tab. 5: Revision History

Glossary

ACR (Automatic component recognition)

A function that recognizes automatically objectives, identifies reflector modules and recognizes the exchange of components.

aperture stop

Diaphragm in an aperture plane.

Auxiliary microscope

Usually used to adjust the illumination system of a microscope. It is especially used in phase contrast microscopy to precisely position the phase ring.

Beam path

The path that light takes in traversing an optical medium or system.

BF (Brightfield)

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

CAN

Controller Area Network. An ISO specification that defines a generic physical layer and data link medium access procedure based on non-destructive bit-wise arbitration.

C-DIC

Differential Interference Contrast in cirularly polarized light, a contrast method which employs the differential interference contrast technique with circularly polarized light, thus fully imaging sample structures which otherwise are only visible in a certain orientation

DF (Darkfield)

Illumination and imaging system that prevents direct light from entering the objective aperture.

DHCP

Dynamic Host Configuration Protocol

DIC (Differential Interference Contrast)

An imaging light microscopy method that converts differences in the optical path length in the object into differences in the brightness of the image

EF (Emission filter)

Color filter for emitted light in fluorescence microscopy; blocks high-energy excitation light.

EX (Excitation filter)

An optical-glass filter commonly used in fluorescence microscopy and spectroscopic applications for selection of the excitation wavelength of light from a light source.

FL (Fluorescence)

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

Fura

Special dye used for calcium imaging

GFP (green fluorescent protein)

A fluorescent protein that exhibits bright green fluorescence when exposed to light in the blue to ultraviolet range.

iHMC (improved Hoffman Modulation Contrast)

Oblique illumination technique that enhances contrast in living cells and tissues by detecting optical phase gradients.

LCD (Liquid-Crystal Display)

Display based on light-modulating liquid crystals and polarization

LD (large working distance)

Abbrevaiation for objectives with long working distance.

Luminous-field diaphragm

Diaphragm that defines the field of view and is usually located in the eyepiece.

NA (Numerical aperture)

Parameter, originally defined by Abbe for objectives and condensers, represented by the expression n · sin a, where n is the refractive index of the medium between the objective and the object, and a is the angular aperture of the objective.

Ph (Phase contrast)

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

PlasDIC

Differential Interference Contrast for Plastic Receptacles

pol (polarization)

An oscillation state of a light wave, characterized by the motion which the light vector describes in the plane perpendicular to the direction of propagation.

PPE (Personal protective equipment)

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

PSU (Power supply unit)

Chiefly used for combinations of transformers and rectifiers that convert AC mains power to a lower-voltage DC power used in electronic devices. Superordinate concept -- see cross reference for specific types.

RL (Reflected Light)

Designation for microscopy techniques to image light that was reflected by the object

RS232

Recommended Standard 232, a standard for interfaces for serial data transmission

TIC (Total Interference Contrast)

Total Interference Contrast in circularly polarized light is a technique for imaging and layer thickness measurement in materials microscopy. Contrary to traditional polarization interferometers, work in this technique is carried out in circularly polarized light.

TL (Transmitted Light)

Light used for illuminating a object, where the light 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 samples (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 sample details) are also of major importance for providing true imaging of the sample. 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, field stop and aperture stop 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.

ZEISS service representative

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

ZEN software

Modular software, that is controlling all ZEISS light microscope sytems and has a wide application field: acquiring images, processing images and analyzing images.

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